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Please return to Gregg Erickson

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February 21, 1978

Ms. Clarissa Quinlan, Acting Director
Division of Energy and Power Development
7th Floor, MacKay Building
338 Denali Street
Anchorage, AK 99501

Dear Clarissa:

FUTURE POWER PLANNING FOR THE RAILBELT

In recent telephone conversations you expressed an interest in receiving suggestions on what gaps and key questions remain following our power planning study for the Railbelt recognizing that time and financial resources precluded our covering all bases.

In response, we convened the "Power Planning Division of Battelle-Alaska" to discuss the situation and come up with suggestions based on our perception of what DEPD and the Alaskan Power Authority face as the next steps. The following paragraphs are a summary of our thoughts, somewhat arbitrarily broken out into the following categories.

- Supply Alternatives
- Power Need (Demand) Forecasting
- Energy Costs and Supply System Management
- Institutional Questions
- Environmental Costs

I have listed the above broad categories in the order of our perception of priority and hence not necessarily in the best order. Each of these areas are discussed in limited detail below indicating why work is needed and what approach might be taken to meet the need. Where there is an obvious correlation with the Corps of Engineers Plan of Study we have so noted.

1.0 SUPPLY ALTERNATIVES

The final version of our current project will pin down the costs of thermal options pretty well. However, the two smaller hydro options (Bradley Lake and Chakachamna) seem to deserve another look--possibly as "bite size" projects for APA and as a vehicle for promoting the cooperation of the utilities in evolution of an ultimate Railbelt Power Pool or coordinating council.

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Based on currently available data, hydropower from Chackachamna and/or Bradley Lake projects appears quite competitive with coal-fired alternatives for meeting the "southern" load center needs which seem to require the earliest attention. Bradley Lake economics are fairly sound whereas the Chackachamna information dates back sixteen years. The project is unique in that it involves about 11 miles of tunneling. The technology for large diameter tunneling has changed markedly since the 1962 Bureau of Reclamation evaluation.

The potential Chakachamna project has the following attributes:

(1) The scale is apt: approximately 350 MW and the project site not far from the CEA Beluga Station and transmission corridor.

(2) Power costs (based on dated information) appear very competitive to coal.

(3) The project has some verbal support from CEA and AMUS although such a project may be beyond their capability.

(4) Geotechnical and environmental cost data is sparse.

(5) Impingement on the proposed Lake Clark National Park is unknown. If the Park is established, it may preclude a Chackachamna project.

(6) Chackachamna, appropriately intertied, could contribute to meeting the power loads required in support of Upper Susitna development as well as general load growth.

The desirability of the Bradley Lake project (70 MW) may hinge as much upon system reliability benefits and handling potential industrial loads (PALNG for example) on the Kenai as upon transmission to the Anchorage area. Both of these issues are somewhat subjective but can be analyzed with well accepted techniques if appropriate load scenarios can be postulated.

Suggested Approach

1. Bradley Lake:

   a. Refine analyses of potential Kenai loads and resources.

      1. Industrial development and conversions.

      2. Intertie to Anchorage area.

      3. Alternative capacity retirements that might be possible.

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2. Chackachamna

   a. Analyze basis for 1962 report.

   b. Evaluate possible institutional conflicts (proposed Lake Clark National Park).

   c. Update capital cost components recognizing changes in construction technology.

   d. Evaluate interaction with future Railbelt system development.

This area does not appear to be addressed in the Plan of Study although possibly in Tasks PF-4, 9, and 14.

2.0 POWER NEED FORECASTING

Eric Yould has already mentioned this as a near term priority item. We concur based on observation of all recent power planning throughout the U.S., and the controversies that can arise. Obviously, it is just good business to obtain the best possible estimate of future loads along with some idea of their uncertainty. Assured timely marketability of power will be necessary to service the debt. The greater the assurance of full marketability, the lower the interest rates. On the other hand, groups opposed to development have found the issue of "need vs. demand" as a powerful vehicle for stopping or delaying projects they are opposed to for one reason or another.

In this regard we do not agree with Bob Cross's comment (page 5 of his letter of January 6th). The "Marbet" case in Oregon was close-by and the distinction between "need" and "demand" is more than just semantics. The same issue is presently strong in other states.

We believe that ISER did as good a job as could be done given the limitations of data and the time and resources they had available. It is possible that their forecasts cannot be substantially improved upon. Nevertheless, DEPD and/or APA are going to have to justify any given project based on forecasts of power need that, even if admittedly not exact, recognize and treat all pertinent variables and their consequences at a level of sophistication that is state-of-the-art. This should be done at least to the extent that opposing interests will admit that DEPD/APA did the best possible job.

As all working in the subject area will agree, this is a difficult area to deal with. Suitable historical data may not be available and direct price elasticities, even if available, are difficult to extend due to the recent marked change in power cost trends. The problem is compounded by substitution of natural gas in the Cook Inlet region. Future Alaskan gas prices will

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increase subject to external market forces and new gas regulation. The consequences are obvious although long-term consumer responses are far less so. Data from other parts of the country may have to be "imported" and adjusted for Alaska.

Battelle is engaged in a project for the Northeast utilities (NEPOOL) that has developed a great deal of data that, if appropriately adjusted, might be applicable. Even if not exact, it probably is the best available.

In any event, we do not agree with Bob Cross that price eleasticity is zero (page 3 his letter of comment) or that ISER's inability to find adequate data even suggests it is really immeasurable. The literature suggests a price elasticity of -0.2 to as high as -4.0 depending on the sector.

Given the uncertainties that all parties should agree exists, we suggest more than just development of better forecasts should be done. The public and decision makers should additionally be informed of the degree of uncertainty and the possible consequences of planning on one outcome and having another actually evolve. This issue was raised by both Bob Cross and Tom Stahr in their comment letters. We concur that it is a very real question but one unfortunately not commonly and publicly recognized.

Therefore, we feel the forecasting requirement is more than the task of just producing better or more defensible forecasts. The latter is the necessary first step but the public and their decision makers need to understand the nature of the uncertainties and the economic consequences of erring in one direction or another. The State of Alaska would probably be ahead of the rest of the country if it factored these uncertainty considerations into its planning process. We strongly recommend that the State do so. California made a start at this issue but it never completed the work. There is fair information available for the consequences of the over capacity but the consequences of being short of capacity are less well understood and would have to be developed. Planning biased on high side forecasts generally provides a higher degree of flexibility through slipping construction schedules. Earlier than anticipated retirement of more costly thermal capacity is another good option.

Suggested Approach

The above power need forecasting area is addressed in the Plan of Study as Power Market Studies Task 1 through 9. The consequences of forecast errors do not appear to be covered in the plan of study.

We also suggest that DEPD or APA establish early a system for information collecting. This could be done in cooperation with the utilities and start assemblying a data base that can be used to improve subsequent forecasts.

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3.0 ENERGY COSTS AND SUPPLY SYSTEM MANAGEMENT

I originally intended to forward separate suggestions relating to energy cost and development of supply system management methods. However, in attempting to put down our ideas in a rational fashion, the subjects became so interrelated that I've lumped them together. This area also goes hand in hand with 2.0 POWER NEED FORECASTING as discussed above and in following paragraphs. Some subdivision of this area is possible as noted below:

Power Plant Unit Energy Costs

The comment draft of the Railbelt study raised a number of questions regarding the cost of thermal power from individual plants. Knowledgeable people within the State suspect that we may have underestimated coal costs and we concur based on new data. There is also a feeling that our capital cost estimates may be high particularly for Beluga. We share that suspicion and recognize that interest and amortization charges are a major component in the total power costs even for thermal systems. The net result of adjusting these costs may be a downward shift of thermal power costs moving them to a more competitive position vis-a-vis the higher cost hydroelectric options such as Bradley Lake. This will make the call more chancey. Our final report on Railbelt power will include adjustments and best guesses as of now.

On the hydro side, Upper Susitna possibly has higher risk of going up in capital cost than coming down. This would likely result if more conservative structural concepts have to be adopted.

The net result of all the above may be a narrowing of the gap between estimated hydro and thermal power costs. Since there will be a continuing need to carry evaluations of alternatives on the ledger, APA should at some point try to improve the estimates of thermal power costs, particularly the "Alaska Factor".

It is one thing to talk (as we did in the Railbelt Study) of costs of power from individual units generating under a set of operating assumptions as to plant factors over time, etc. It is another thing to address the cost of power generated by a system where cost minimization can be improved by load dispatching to generating units with successively higher marginal costs of production. With efficient load dispatching, recognizing the seasonal or other constraints on capacity, considerable reduction in overall power costs can be achieved. Individual plant factors can however significantly differ from the assumptions we have used thus far and the optimum can only be achieved through iterative solutions and some computerization is essential.

The important thing is to plan the system and not just single units. This includes not only the call up of new capacity but the retirement of more

costly capacity. We did not do this in our Railbelt Study as time and resources did not permit. This omission is probably the greatest shortcoming of our report--we never retired any higher cost units. System power cost should also include transmission, distribution and billing costs.

Typically plants operated in a system are called on, or loaded, in a sequence from the least to the most expensive to fill the area under the load duration curve. Usually, high capital, low operating cost plants are base loaded and the reverses are placed in peaking service to the extent they can load follow.

The inclusion of conventional hydropower complicates the problem of finding the minimum cost operating plan. The marginal cost of hydro is essentially zero. This implies that conventional hydro plants should be the first in the economic loading order. However, the total amount of hydro energy available is limited by the river flows and reservoir sizes. Usually, the total energy is not sufficient to run the hydro units 100 percent of the time at fuel capacity. Nevertheless, the economic loading strategy should be such that all the hydro energy is discharged. Although base loading hydro can achieve this objective, in a mixed hydro thermal system, the economically optimum full discharge strategy is to employ the hydro capacity to remove as much of the area under the load duration curve from the top of the curve and thus minimize call up of the most expensive energy.

This is a difficult concept to cover in a brief letter but will be quite an important factor to consider in minimizing the system-wide cost of power. This will be a tricky thing to handle in resource planning as the seasonal load curves must be considered, the seasonal availability of water either for storage or discharge, and the nature and load following ability of various thermal units in the system must be taken into account. There are a number of linear program "global"(a) optimization codes that have been used around the country and elsewhere. However, given the nature of the probable future Railbelt system, the number of uncertainties involved and cases that you might want to examine,(b) we do not feel they are appropriate at this time. These codes can be very complex and also costly to run but still suffer from the "exact solution to an approximate problem" syndrome. A simple deterministic simulation approach appears more appropriate at this time for Alaska. Nevertheless, it is certainly appropriate and desirable for DEPD or APA to familiarize itself with the more advanced planning tools and seek one that best fits the Alaska context.

(a) In the sense of optimization over a several decade planning horizon.

(b) For example, just on Upper Susitna alone, there will be a number of alternative dam heights and reservoir volume cases to be considered that will need to be integrated with the Design Tasks in the Plan of Study. Devil Canyon before Watana is one option for example.

It should be recognized that the manner in which the Upper Susitna hydro-system is operated will affect downstream flow modifications that will have bearing on the environmental impact. Thus evaluations of Susitna loading should be done fairly early so that the results can be used in the environmental assessment.

Suggested Approach

To some extent the above area is addressed for Susitna hydro in the Plan of Study Tasks PS-1, 2, 4, PS-12, 13 and PM-10.

In terms of system planning, we suggest that a system be put in place to enable rapid caluclation of the cost of power as a function of a number of variables: physical, loads, economic, regulatory, and timing. The results given in our Chapter 8.0 were hand calculated on a very few options, and did not portray power costs. Even so, these computations consumed considerable time. The best approach to this area is beyond the scope of a letter.

For thermal options we suggest the following:

1. Alaska Location Factors:

    a. Refine locational factors effecting capital costs including attention to scale effects, proportion of material vs. onsite construction costs, etc.

2. Alaska Specific Factors:

    a. Refine special factors such as escalation (over "lower 48") required for

        1. Plant enclosure needs
        2. Covered coal storage and handling systems
        3. Cooling systems special requirements
        4. Costs of other raw materials, e.g. limestone.

    b. Base refinement on discussions with utilities, component suppliers, transportation concerns and Alaskan construction specialists.

In addition, some early-on work is desirable on evaluating when the Cook Inlet-Fairbanks intertie should be scheduled. Given the probable power demands for construction of Upper Susitna, the intertie may be desirable earlier than previously supposed.

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4.0 INSTITUTIONAL QUESTIONS

The sheer length of our Chapter 10 attests to the extent of the institutional problems! Being aware of some of the problems that have occurred in the "lower 48", we believe the State should develop a plan, very likely of the critical path type, laying out what has to be done, when, and in what detail to meet the various Federal and State requirements. This should parallel the development of a framework for the legal work required. Too often the lawyers get into the act late in the game and the planners and engineers find they missed assemblying the data and documentation necessary to meet the various statutory requirements.

Another area involves the terms and conditions of power sales contracts. I presume APA will eventually evolve into the role of a marketer of bulk power to the distribution utilities. How these contracts are drafted will affect APA's position in the money market. Close working with bond attorneys and consultants will be necessary.

Careful monitoring of the D2 lands plan should also be maintained regarding site identification and potential restrictions.

The Coastal Zone Act requires another look particularly as a source of financial assistance to the State. This is particularly pertinent to Beluga and Chakachamna projects.

Dick Schuller of Battelle-HARC along with Joel Haggard put forward some thoughts on energy facility siting to you last year. Given probable developments, their ideas are still germane but perhaps now can be better focused.

Federal policy: This should begin to gel in a few months. The pertinent aspects include coal conversion, fuel excise taxes, well head regulation, alternative wheeling and interconnections, contingency plans, and conservation programs. I expect that a log of loop holes will be included in the "final" version and DEPD/APA should profit from keeping abreast of the developments and their impact on the State. Possibly the State could influence regulatory interpretation of the Act as it applies to Alaska.

5.0 ENVIRONMENTAL COSTS

In our Railbelt analysis, we did not get into this area at all although that was the original intent--there just was not enough time and there obviously were other more crucial items to deal with. Nevertheless, the environmental costs of all alternative generation modes are going to have to be developed as part of any project licensing and siting requirements (See Chapter 10.0).

In the Interim Feasibility Report, the Corps went about as far as they could on the Upper Susitna projects based on the available data. Any further analysis should probably await the results of the various elements called out in the Plan of Study.

To our knowledge, there is little information on the environmental costs of the potential Bradley Lake and Chakachamna projects and their associated transmission facilities. It may be premature to pursue environmental studies on these until their potential is better understood from an economic and systems integration standpoint. Anadromous fisheries effects, pool level fluctuation, habitat effects and transmission corridor questions will be the key elements for Chakachamna. Pool level fluctuations and transmission corridor questions are possibly the major issues for Bradley Lake.

For the coal fired thermal options, presumably CEA and GVEA/FMUS will cover the appropriate environmental analysis as part of their responsibilities in connection with Beluga or Healy-2 projects. Therefore it may not be necessary for DEPD/APA to become directly involved unless the latter is a participant in the financing. However, APA will ultimately have to treat the environmental costs of alternatives to hydroprojects as part of the NEPA requirements and will need at least generic environmental cost data at a minimum.

Suggested Approach

1. Generic Effects:

   a) Develop information on atmospheric emissions, water quality parameters, land use, solid waste disposal, water consumption and employment for power plants per se.

   b) Develop information on associated operations including mining (coal and limestone) effects such as land disturbance, restoration, water quality impacts and so on including attention to the requirements of the Surface Mine Restoration Act. Transportation system impacts must also be covered as well as transmission systems.

2. Site Specific Effects:

   a) The Healy site may well become saturated with Healy-2 and may even run into problems with the latter unit from the standpoint of compliance with the Air Quality Act amendments and ice fogging of the highway. Careful analysis of air quality factors should be undertaken including modeling of terrain effects.

   b) For the interior load center, alternative siting plans should be developed with the primary issues being air quality and water questions. We earlier thought that the Nenana Area might make sense but new meteorological data suggest it may be out and siting at Clear may be better.

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c) The Beluga area may be in good shape from an air quality standpoint due to prevailing ventillation. Water availability and disposal may be a larger factor and deserves attention.

My apologies for the length of this letter and the delay in getting it to you. The general set of questions you raise are not simple however, and this note can only touch the surface. I hope to be in Anchorage in the near future and would like to discuss these matters with you and Eric.

Gregg Erickson, Director of Research for Legislative Affairs, also expressed interest in these areas so I'm giving him copy coverage.

Hope the above thoughts are of value. Please call if there are any questions.

Best regards,

Ward

W. H. Swift, Project Manager
Alaska Power Planning

WHS:nm

cc: E. Yould
G. K. Erickson

Batelle Report

The capital and operating costs for both fossil fuel and hydroelectric generating plants were discussed in Chapter 6.0. The capital and operating costs for fossil fuel generating options to be used in this analysis were presented for the Anchorage/Cook Inlet/Kenai region and the Fairbanks region in Tables 6.13 and 6.14, respectively. The hydroelectric capital and operating costs to be used were presented in Tables 6.10 and 6.11.

The fuel costs were also discussed in Chapter 6.0. The best estimates of the fuel costs were summarized in Figure 6.8.

The interest and escalation rates corresponding to each of the three inflation rate scenarios were presented in Table 7.1.

8.3 LEVELIZED COSTS FOR SELECTED GENERATING OPTIONS

8.3.1 Description of Selected Options and Summary of Costs

The levelized cost of power for 28 fossil fuel and 4 hydroelectric generating options available to the Railbelt are presented and analyzed in this section.

Four types of generating units were analyzed: 1) 100, 200, and 400 MW coal steam turbines, 2) 100 MW gas combined cycle units, 3) 100 MW oil combined cycle units, and 4) various hydroelectric options. Costs of power were calculated for coal fired steam turbine plants located at Beluga, Anchorage, Healy, and Nenana. Coal was assumed to be supplied from the Beluga area reserves (Threemile or Capps Fields) to Beluga plants and from Healy via the Alaska Railroad to the other locations. Alaska Power Authority (APA), REA, and municipal plant financing options were examined. Fuel supply financing was assumed to be private throughout. Coal plants were evaluated with and without flue gas desulfurization (FGD).

Costs of power were evaluated for oil-combined cycle units located in the Cook Inlet and Fairbanks (North Pole) area. The fuel for these plants is assumed to come from refineries in the same areas. As with coal fired plants APA, REA, and municipal financing options were examined.

Gas combined cycle units were also assumed to be located either in Cook Inlet or North Pole area. Fuel for units in the Cook Inlet area were assumed to obtain fuel from the Cook Inlet area while those located at North Pole were assumed to obtain gas from the proposed ALCAN gas pipeline. All three financing options were again evaluated.

Four hydroelectric projects were examined: 1) Bradley Lake, 2) Chakachamna, 3) Watana only (Upper Susitna), and 4) Watana plus Devil Canyon (Upper Susitna --proposed by Corps of Engineers). Data for these options were based upon Corps of Engineers cost estimates.

The costs are summarized in Tables 8.1, 8.2, and 8.3 for the 0%, 4%, and 7% inflation scenario, respectively. Costs are presented for plants coming on line in 1980, 85, 90, 95, and 2000. Appendix D provides details of the cost estimates and all assumptions used in their derivation.

8.3.2 Analysis of Results

Many issues can be analyzed by examining the data presented in Tables 8.1, 8.2, and 8.3. Several of these are discussed in this section.

Lowest Cost of Power to the Railbelt

Hydroelectric options typically produce power at about 1/2 to 3/4 the cost of coal steam turbines and combined cycle units. These results are true for all three inflation rates. It is important to keep in mind that the estimates upon which the hydroelectric costs are based are the results of preliminary studies only. As further site studies such as the Plan of Study for Upper Susitna Hydro Power are undertaken the capital costs may increase.(1) The capital costs of the Upper Susitna hydroelectric options would have to approximately double to eliminate the cost of power advantage that exists using present data. The costs presented for the Watana and Watana plus Devil Canyon include the cost of transmission to the Fairbanks and Anchorage load centers.

The hydroelectric options have relatively long planning and construction lead times. For example, it is estimated the Watana or Watana plus Devil Canyon will not be available until at least 1991. Bradley Lake and Chakachamna

TABLE 8.3. Levelized Cost of Power for Railbelt Generating Options
7% Inflation Rate

Case Number	Generation Type	Location	Fuel Source	Plant Financing	F.G.D.	Power on Line Date 1980	1985	1990	1995	2000
1	Coal Steam Turbine	Beluga	Beluga	APA		Case Deleted				
2						Case Deleted				
3					Yes	116.25	183.80	290.93	460.96	731.03
4					No	105.41	166.97	264.74	420.13	667.24
5						Case Deleted				
6						Case Deleted				
7					Yes	124.58	196.92	311.58	493.47	782.20
8					No	112.67	178.40	282.74	448.45	711.84
9						Case Deleted				
10						Case Deleted				
11		Anchorage	Healy		Yes	116.77	185.13	293.80	466.65	741.74
12					No	106.74	169.49	269.36	428.38	681.74
13				REA	Yes	124.38	197.13	312.68	496.37	788.53
14					No	113.48	179.99	285.88	454.39	722.68
15				Municipal	Yes	118.06	187.17	297.01	471.70	749.69
16					No	107.87	171.28	272.17	432.80	688.70
17	(400 MW)			APA	Yes	113.07	179.22	284.35	451.57	717.74
18	(100 MW)				Yes	131.56	208.17	329.72	522.69	829.27
19	Gas Combined Cycle	Cook Inlet	Cook Inlet		NA	120.99	195.35	312.40	499.93	800.51
20				REA	NA	122.44	197.63	316.00	505.59	809.42
21				Municipal	NA	121.24	195.74	313.02	500.90	802.04
22	Oil Combined Cycle			APA	NA	118.12	189.62	303.17	485.07	776.57
23				REA	NA	119.57	191.90	306.77	490.73	785.48
24				Municipal	NA	118.37	190.01	303.79	486.04	778.11
25	Coal Steam Turbine	Healy	Healy	REA/Munic.	Yes	114.35	180.44	284.96	450.41	712.43
26					No	101.73	160.75	254.22	402.32	637.15
27		Nenana			Yes	127.34	201.35	318.64	504.64	799.78
28					No	114.09	180.66	286.29	453.98	720.34
29				APA	Yes	119.14	188.45	298.34	472.68	749.46
30					No	107.05	169.57	268.83	426.50	677.08
31	Oil Combined Cycle	North Pole	TAPS	REA/Munic.	NA	122.24	196.10	313.38	501.13	801.86
32				APA	NA	120.75	193.76	309.70	495.34	792.74
33	Gas Combined Cycle		ALCAN	REA/Munic.	NA	125.11	201.83	322.60	515.99	825.79
34				APA	NA	123.62	199.49	318.93	510.20	816.68
40	Hydro	Bradley Lake	NA		NA	80.32	124.88	194.42	303.00	472.71
41		Chakachamna			NA	76.39	119.37	186.66	292.09	457.37
42		Watana			NA	55.19	86.64	136.05	213.69	335.72
43		Watana + Devil Canyon			NA	43.55	68.25	107.00	167.84	263.35

also have long lead times. At the present time there are no plans to intertie the Fairbanks and Anchorage load centers until construction of the Upper Susitna projects. For these reasons both the Fairbanks and Anchorage areas will have to add new thermal capacity before any of the hydroelectric options evaluated here could come on line if they are to meet the forecasted load growth as noted in Section 8.5. The cost of power produced by the various fossil fuel generating options for the Anchorage and Fairbanks areas are discussed below.

Lowest Cost of Power to the Anchorage Region(1980-1990 Power on Line Date)

To compare the costs of power for the Anchorage area an assumption must be made about the costs of transmission from Beluga to Anchorage. These transmission costs were estimated to be 2.5 mills in 1975 dollars.(2) Using the Handy-Whitman index this is equivalent to about 3.9 mills in January 1, 1977 dollars. This estimate is used in this comparison.

Assuming that FGD is required coal steam turbine units located at Anchorage and combined cycle units located on Cook Inlet produce power delivered to Anchorage 5-9% cheaper than coal steam turbine units located at Beluga. If FGD is not required the cost of power from the coal steam turbine units becomes cheaper than power from the combined cycle units.

Lowest Cost of Power to the Fairbanks Region (1980-1990 Power on Line Date)

As was the case with the Anchorage region, assumptions must be made about the costs of transmission from Healy and Nenana to Fairbanks. It is assumed that transmission costs increase the cost of power by 3.0 mills from Healy to Fairbanks and 1.5 mills from Nenana to Fairbanks.

Assuming that FGD is required, the oil and gas combined cycle units located at North Pole produce power at a lower cost to the Fairbanks market than coal steam turbine units located at either Healy or Nenana. Assuming the FGD is not required the coal steam turbine units product the cheapest power for the Fairbanks market.

8.4 SENSITIVITY ANALYSIS

8.4.1 Sensitivity of ECOST2 Results to Changes in Input Parameters

In any parametric analysis such as is presented in Section 8.3 it is important to know which input parameters have the most effect on the results, i.e., which input parameters are the results most sensitive to. This information serves as a guide to the analyst pointing out those parameters which maximally affect the results. Additional research can then be focused on those parameters to insure their accuracy. This information is also useful to the reader since it allows he or she to focus attention on the derivation or source of the parameters which the model is most sensitive to.

To test the sensitivity of ECOST2 to the input parameters, each parameter was varied between a value 10% higher than the base case and a value 10% lower than the base case (20% total change). The percentage change in the levelized cost of power for the years 1980 and 2000 were then calculated from these model runs. These percentage changes are presented for three cases in Table 8.4, 8.5, and 8.6. Table 8.4 corresponds to a coal steam turbine unit located in the Anchorage area (Case 11). Table 8.5 corresponds to a gas combined cycle unit located in the Cook Inlet area (Case 19). Table 8.6 presents the results for the Watana hydroelectric project (Case 42). In each case the relative change in the levelized cost of power caused by a 20% change in the input parameter for 1980 and 2000 power on line dates are entered in the first two columns. The parameters that the model is most sensitive to are ranked in Column 3.

The data presented in Table 8.4 indicates that the results presented for Case 11 (and for the other coal steam turbine plants also) are most sensitive to the fuel escalation rate. The results are also relatively sensitive to the unit fuel cost, heat rate, and plant utilization factor.

The data presented in Table 8.5 points out that the results for the oil and gas combined cycle cases are also most sensitive to the fuel escalation rate. Again the results are also sensitive to the heat rate and unit fuel costs.

TABLE 8.4. Sensitivity of Levelized Cost of Power to 20% Change in Input Parameters - Coal Steam Turbine - (Case 11)

Input Parameter	Sensitivity (% Change) Power on Line Date 1980	Sensitivity (% Change) Power on Line Date 2000	Relative Sensitivity
Capital cost	8.1	8.5	4
Heat rate	11.0	11.8	2
Operating and maintenance cost	1.1	0.7	
Financing discount rate	6.9	6.7	6
Facility construction time[a]	0.1	0.1	
Payback period[b]	6.4	6.4	7
Insurance rate	0.2	0.2	
Tax rate	0.7	0.7	
Interim replacement rate	0.3	0.3	
Plant utilization factor	10.0	9.3	3
Unit fuel cost	11.0	11.8	2
General inflation rate	0.7	0.96	
Construction escalation rate	0.3	10.7	5
Fuel escalation rate	15.1	34.4	1

(a) Facility construction time is considered an integer in the analysis. It was varied between 4 and 6 years (50% change).
(b) The sensitivity of ECOST2 to changes in the payback period was tested separately since the present formulation constrains the payback period to 5 year increments.

As shown in Table 8.6 the results for the hydroelectric cases are most sensitive to the capital cost estimates, construction escalation rate, financing discount rate, and plant utilization factor.

8.4.2 Special Sensitivity Analyses

This section points out some additional concepts and parameters which have a relatively strong impact on the analysis presented in this chapter.

TABLE 8.6. Sensitivity of Levelized Cost of Power to 20% Change in Input Parameters - Hydroelectric - (Case 42)

Input Parameter	Sensitivity (% Change) Power on Line Date 1980	Sensitivity (% Change) Power on Line Date 2000	Relative Sensitivity
Capital costs	21.8	21.9	1
Operating and maintenance costs	0.3	0.2	
Financing discount rate	21.1	21.2	4
Facility construction time[(a)]	0.3	0.3	
Payback period	2.4	2.4	
Insurance rate	0.2	0.2	
Tax rate	1.9	1.9	
Plant utilization factor	23.1	23.1	3
General inflation rate	0.3	0.4	
Construction escalation rate	0.0	27.3	2

(a) Facility construction time is considered an interger in the analysis. It was varied between 5 and 7 years (40% change).

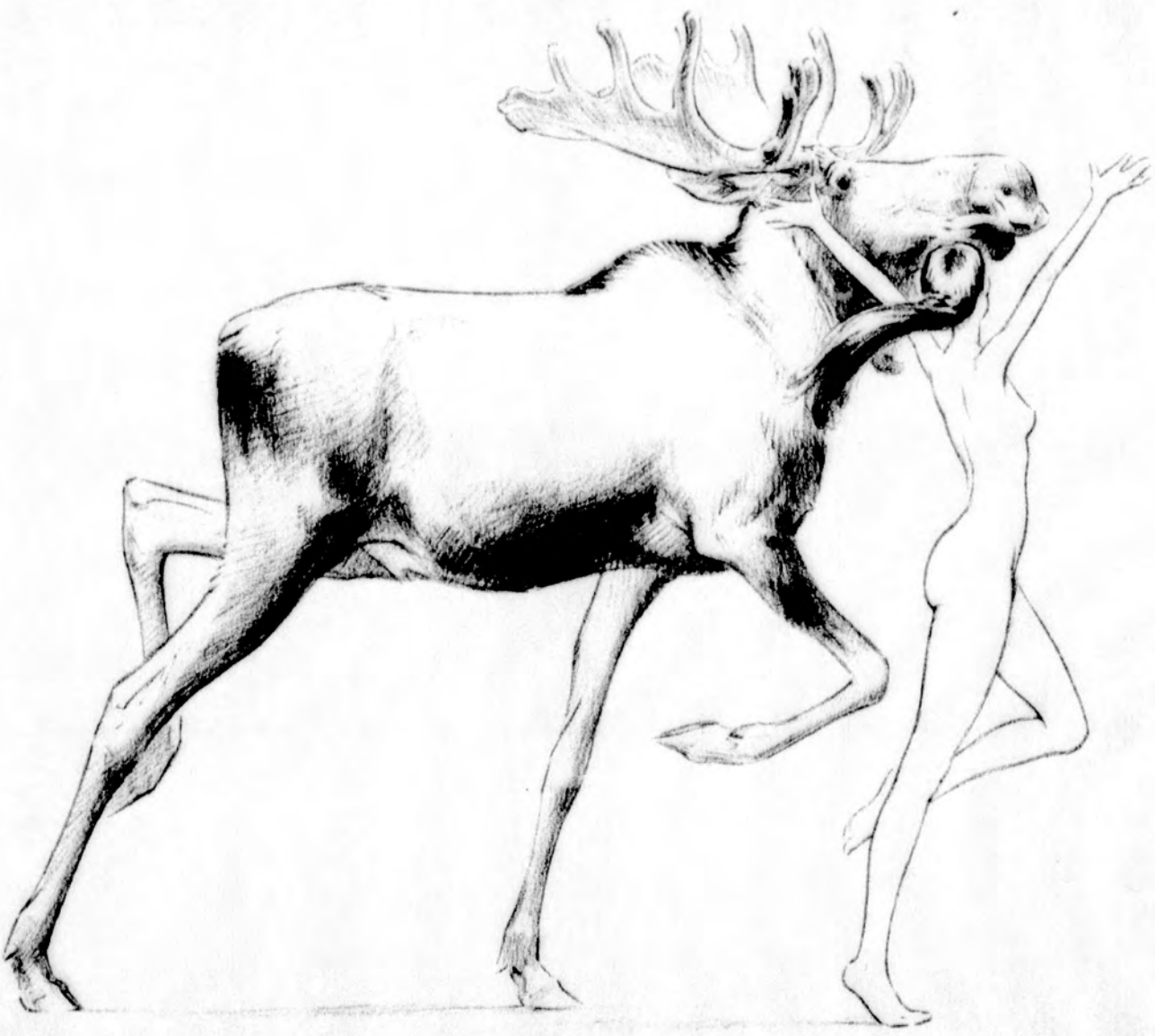
Plant capital costs contribute a greater portion of the total cost of power for coal steam turbine plants than for combined cycle plants. Fuel costs largely determine the cost of power from a combined cycle plant. The effects these differences have on the relative annual cost of power for steam turbine and combined cycle plants is shown in Figure 8.2. The annual cost of power from the steam turbine increases much more rapidly as the PUF decreases than does the annual cost of power from the combined cycle plant.

These differences have a significant impact on the decision as to which type of capacity to build. If the capacity is to be used for base load (high plant utilization) steam turbine units are more attractive relative to combined cycle units than if the new capacity will be used to meet intermediate or peak loads (low plant utilization). Steam turbine units must be operated at a relatively high PUF to keep the costs of the power produced down. Combined cycle units on the other hand can be operated over a wider range of PUFs without such a significant increase in the cost of power. For these

Alaska Conservation Review

THE ALASKA CONSERVATION SOCIETY

SPRING 1979



ALASKA CONSERVATION REVIEW

Vol. XX, No. 1

Editor: Larry Mayo

COVER

Melissa and McGonnegal

by Bill Berry

IN THIS ISSUE

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Editorial . . .

THE ALL-OPEC PIPELINE

I wish I could remember all the arguments why the oil line to Valdez was to be so much better. Even worse, I wish I had obtained signed, legally binding statements that would have insured that the pre-pipeline promises would hold true. One of the prominant reasons for the Valdez line, which we can all remember, is that it would be an "all-American line"; American producers, American transportation, American customers, and no way for OPEC shenanigans to interfere with a purely American venture. In November 1973 OPEC raised its prices to about $8 per barrel of crude, which punctuated the need for an independent domestic oil supply.

Last week, OPEC raised its crude prices significantly. Within a day, heating oil prices in Fairbanks rose 20 percent. Alaskan oil, refined and distributed within the state, costs as if it were OPEC oil. Energy independence? All-American?

During the fray before the Alyeska Pipeline was built, the conservation community claimed that Alaska was going to be torn up for corporate profits more than for oil for America. For example, most Alaskan oil would probably end up in Japan even though the domestic fuel shortage of 1973-74 was the primary stimulus for building the pipeline. Industry vigorously denied that point of view. In this case, however, Congress insured that Alaskan oil would be considered as domestic supply by prohibiting its export. The Alaskan congressional delegation is now arguing for the sale of Alaskan crude to Japan even during the current energy shortage.

Take heed! Important lessons can be learned from the above examples for both conservationists and the public in general. Listen carefully to the significant proposals, and pay particular attention to the environmental and quality of life promises being offered. If the promises are sincere, then there should be little trouble incorporating them into enabling legislation or managing regulations. If the promises are not sincere, then expose it and help straighten out the debate so it covers the real issues.

L.R.M.

IN TRIBUTE TO BILL BERRY

By Rosemarie and Neil Davis

In a memorial for him at the Noel Wien Library in Fairbanks, the collection of William D. Berry's work was an impressive sight. Hurriedly assembled by family and friends following Bill's sudden death on May 14, 1979, this collection was but a part of his life's artistic production; yet the sheer number and the variety of items displayed made a huge impact upon all who knew him.

Bill had started his career as a wildlife artist even before he could draw. His first works, at age three, were animal figures cut from paper with scissors. As Bill grew older, he came to recognize fully the violence in nature, but he never portrayed it in his art. Even during the years when he served in World War II, his art centered on the humor, kindness and good of which men were capable. He chose to oppose the evils of life by creating images of compassion and warmth.

That night at the memorial, Bill's unfinished mural on the library wall was simultaneously the backdrop and the focal point for the display of his work. In the mural Bill had created a comprehensive and compatible habitat for his cast of real and imaginary characters. The immense effort and time Bill put into the mural was typical of most of his projects. This one went slowly, in part, because the project was not just a painting; it was a social happening. Many hours were spent talking about the mural, painting, or life in general with children and adults who stopped by to watch Bill work.

In other ways, the unfinished mural was like Bill Berry's Wildlife Map of Alaska completed in 1966. Each part of the map was a little painting in itself, done in intricate detail. Bill used a brush with a single camel's hair to paint the irises in the eyes of the salmon seen leaping out of the Gulf of Alaska and Bristol Bay. He repainted the sea urchin when he discovered that the sea urchins of the region were slightly different in color than the one he had first portrayed.

Weeks could go by without the casual observer being able to notice change in the wildlife map. Of course Bill knew what changes he had created, and he never seemed impatient with himself. Besides, the normal flow of life takes time. It takes time to paint birthday cards for family and friends and to build elaborate animal masks for parties. It takes time to livetrap the flies and the bees that have gotten into the studio and to carry them outside to freedom.

Bill's eye could capture an animal's pose with incredible speed. One fleeting glimpse of a bird or the arching turn of a moose's neck created an instantaneous perception in Bill's mind that was quickly transformed into a field sketch. Then months or years might pass before the initial perception evolved through a series of secondary sketches or color separation plates (each individually painted) to emerge finally as a finished work.

For Bill Berry, the end seemed not nearly as important as the getting there – and, while getting there, maintaining a tolerance for all ways and forms of life.

The President's Page . . . By Edward Murphy

BEYOND (d) (2)

The Alaska (d)(2) legislation has been a focal issue of national conservation organizations as well as Jimmy Carter's top conservation priority. As a member group of the Alaska Coalition, the Alaska Conservation Society has committed itself to a strong environmentalist bill. Yet coincidently the Society has attempted to infuse a uniquely Alaskan perspective into the coalition and thus into a National Interest Lands bill. For example, sport hunting is generally compatible with wilderness integrity in Alaska; indeed, for many, it is integral to the Alaska Wilderness experience. Consequently, the Society has pushed for the establishment of National Preserves rather than National Parks in many areas in order to maintain this use.

Some of those members of the Society who have worked closely with the Alaska Coalition or have testified before Congress have felt their efforts were frustrated, if not futile. Issues important to Alaskans have been minor issues in the national perspective. Today, the Society's limited power in shaping legislation is undoubtedly waning further as Congress approaches the final stages of a bill acceptable to both houses.

We shouldn't be very surprised nor too upset that the Society has not been heard nor our position carefully weighed in the legislative proceedings. The Society is a small, primarily Alaskan group; our ability to influence national issues is thus slight. Yet we have had considerable influence at state and local levels on other issues. Much of the fine-tuning of the federal management of new parks, preserves, wildlife refuges, and forests will occur at these latter levels after passage of a National Interest Lands bill. This will also be the time when we will be able to infuse our perspective into the decision-making process.

Federal agencies must seek public input and review on a number of management decisions. As many of us have sensed, particularly after visits to Yosemite and Yellowstone National Parks, park designation is not necessarily synonymous with management for wilderness quality. The National Park Service's development plans for areas within its jurisdiction will certainly require close scrutiny by the Society. There will also be numerous decisions on uses compatible with proposed wilderness status for much of the National Interest Lands. We should remember that present use patterns, for example backcountry cabins, have not precluded potential wilderness designations – many human activities have left Alaskan wilderness "essentially unaltered" in the language of all proposed bills. Will the public have input into decisions on permit systems and access? Will backcountry cabins be left open for public use or locked as are those in McKinley Park? These are questions which may seem trivial at the present time but which will greatly affect the degree to which traditional Alaskan uses persist on federal lands.

The National Interest Lands legislation and settlement of Native Land Claims will checkerboard the patterns of land ownership in the state. The (d)(2) issue has overshadowed important conservation questions in state-owned areas. With very little public involvement, the state has developed a five-year lease plan for offshore oil and gas. Has the public, who are the ultimate beneficiaries of such sales, had sufficient input into these decisions? How do we know that the decisions are being made with full understanding of environmental effects and economic trade-offs? The Society must strive for greater public awareness and input in the state's decision-making process.

The pattern of the state's future development will be determined by a handful of issues such as the Susitna Dam project. As part of the feasibility study approved in the last legislative session, a study of alternative sources of power, both hydroelectric and other, will be conducted. The Susitna Dam would be an expensive project, which, when eventually completed, would generate an overabundance of expensive energy – overabundance, that is, unless we Alaskans were unwisely to desire and to push for rapid population and industrial growth in the railbelt area. Hopefully, the alternative study will carefully weigh alternatives of smaller scale in relation to the needs of moderately growing communities in this area. The decisions made on this project will play a major role in the future patterns of growth of the entire railbelt region.

I look forward to passage of a National Interest Lands bill. National conservation organizations and the President see the bill as the end of a long effort. As they turn their attention away from Alaska, we Alaskans will be able to focus better on conservation issues within the state. Perhaps most importantly, however, passage of a bill will be the end of a battle which has fragmented and sharply divided Alaskans. The (d)(2) issue has not been simply a conservation issue within the state; it has also been a complex issue of state vs. federal control of land, individual freedoms, and unnecessary or unwanted federal regulation. By joining the Alaska Coalition, by viewing the (d)(2) issue as a critically important conservation issue, the Society has alienated old friends who saw the proposed legislation from other perspectives. Once the legislation is passed, the Alaska conservation community will again find a focus and a unison so sorely lacking these past few years.

What Next? . . .

MARINE MAMMALS

By Dr. Francis H. Fay

The mammals of Neptune's kingdom have had a curious history of interaction with human officialdom. They have been ignored, dealt mischief, bombed, clubbed, studied, embraced, and, most recently, drowned in verbage. And, in Alaska, the story spins on.

Under federal jurisdiction from 1867 through the first 58 years of this century, any marine mammal of commercial value was exploited mercilessly. Bowhead, humpback, and gray whales almost disappeared; walrus ebbed to scarcity; fur seals declined, and sea otters disappeared from most of their Alaskan range. Other species, like sea lions and harbor seals, were harassed away from salmon fishing grounds. In the 1950's, when bounties weren't stimulating enough of a seal kill, territorial officials depth-bombed seals chased from mudbars in the Copper River delta.

Meanwhile, currents of protectionism were rising in the slack water of the nation's bureaucracies. Official protection from unregulated killing was extended to fur seals and sea otters in 1911, to bowhead and gray whales in 1931, and to humpback whales in 1946. In 1959-60, when new management authority for non-treaty mammals (mammals not covered by international treaties), passed to the new State, Alaska swiftly developed a basic conservation regime consisting of broad-ranging research, controlled harvests, and adequate protection. Despite pointed criticisms from fishermen, who had fish stolen and nets destroyed by seals and sea lions, and from people who believe that airborn hunting of polar bears is ethically wrong, the State's program deserved the respect it received from scientists and most user groups.

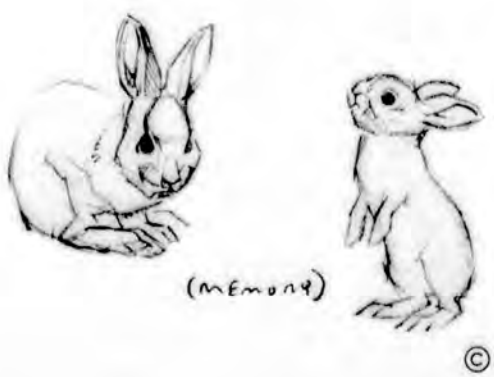
In 1972 Congress wiped out State management with the Marine Mammal Protection Act. Regulated harvests were replaced by unregulated and unrecorded harvest under remote "control" by federal agencies. The State's research program largely disintegrated and was saved from total chaos only by money for environmental assessments of oil and gas leasing impacts.

The 1972 Act set up a process through which a state can regain management authority (with constant federal review) and the moratorium on marine mammal harvests can be waived. In January 1973, Alaska applied for a waiver of the moratorium and return of management for nine species. In April 1976, management authority for walruses alone was returned to the State, but the State is beginning to wonder why it bothered. There has been a running battle over the amount and kind of data the State is required to provide annually to justify its program; federal officials insist on vastly more information than they ever obtained themselves. And just a few weeks ago, a court decision on the taking of walrus for ivory by Bristol Bay natives suggests that under the Marine Mammal Protection Act neither the State nor the Federal government may be able to regulate subsistence harvests until the stock on mammals is depleted. Codified crisis management, some call it.

Meanwhile, the State's request for management of belugas, of bearded, ringed, ribbon, spotted, and harbor seals, of sea lions, and of sea otters and polar bears oozed through muddy bureaucracies for six years, almost to the day. In January 1979 the National Marine Fisheries Service and Fish and Wildlife Service told the State that management would be returned if the latter would agree to accept certain harvest quotas and meet detailed reporting requirements. The State faces a tough choice: accept requirements that, quite literally, no one could meet (thus risking endless court cases and injunctions), or forget the whole thing and hope that the Federal government can some day put together a management program itself.

Frustrated by this endless legal and political tangle, the State told federal agencies on June 4, 1979, that "unless there is satisfactory resolution of the waiver and our legal authority to manage, by notice of this communication we are returning walrus management to the Department of Interior, effective July 1, 1979 . . . . The State will not allocate any funds toward marine mammal management in F.Y. 1980 . . . Our marine mammals staff will be disbanded over the next year and a half . . . ."

Out beyond, where the tawny rockweed glistens on black polished rocks, a growing bottom fishery forewarns us of a problem in ecosystem management – the likes of which we've never seen – that could rip apart present balances of fur, fins and feathers in the North Pacific. In the Bering Sea, walrus numbers seem to be reaching a historic peak, with a crash very possibly only a year or three away. On Chukchi and Beaufort ice, Eskimo hunters kill uncounted numbers of polar bear sows with cubs, a sure-fire way to have the most impact on bears with least human benefit. Seismic blasting east of Barrow is pushing ringed seals and their newborn pups away from traditional fast-ice areas. It isn't at all clear that federal officialdom really cares.



CONCERNS ABOUT THE SUSITNA HYDRO-PROJECT

By Roman Motyka and Terry Reichardt

The need for the large amounts of electric power that will be provided by the Susitna River Dams Project has not been demonstrated. Total residential industrial electrical energy consumption in the railbelt area was about 1.9 billion kilowatt hours (KWH) in 1977. The two Susitna dams will produce 6.9 billion KWH, over 3-1/2 times the amount of energy needed to meet 1977 consumption. We feel that the growth projections used to justify the project are inflated and unrealistic. For example, when APA has projected energy demands for the Alaska railbelt (i.e., the Anchorage-Fairbanks area), they have included the energy needs of the Kenai Peninsula and of the military. In fact, the power needs of the Kenai Peninsula will primarily be met by the Bradly Lake hydro-project. The military in Alaska has always generated its own power in the past and very probably would not use a centralized, highly vulnerable energy source such as Susitna, in the future.

The APA's projected growth patterns include a doubling to tripling of railbelt population in less than 20 years and a continued annual increase in per capita energy consumption of 3 percent or more per year. These projections result in energy demands of four to ten times present needs by 1995. The most recent trends in population growth and energy conservation in Alaska make such projections totally unrealistic. In fact, statistics from Golden Valley Electric Association (GVEA), the major commercial utility in the Fairbanks region, show that their per customer energy consumption is declining in Fairbanks. During the past three-year period, GVEA residential and commercial/industrial per customer usage has DECLINED at average rates of 12.5 percent/year and 5.5 percent/year, respectively. Statistics from Anchorage utilities and from APA show that the annual increases in per customer usage have tapered significantly in the Anchorage area over the past three years. Total energy consumption in the Fairbanks area actually declined in 1978. Present energy consumption in Fairbanks is running considerably below what had been projected for this community in the Corps of Engineers' initial feasibility study.

The Corps of Engineers has overestimated future power needs before. This occurred when justifying the construction of the Snettisham Dam near Juneau. The dam was built by the Army Corps of Engineers and is administered by the Alaska Power Administration. Although brought on line in 1973, the Juneau Power Utility is buying only one-fifth of the total capacity of the project. Consequently, the cost of power to the utility company is over twice the rate the Corps originally anticipated. Because of the slow growth in load, in order to cover the interest rates on the bonds that funded this project, it is expected that the price will again be increased in 1985 by 75 to 80 percent. With a much bigger project such as the Susitna, such a mistake would be a financial disaster.

No matter what the increase or decrease in energy consumption will be, the Susitna Project will not come on until the turn of the century. Utility companies will be required to build new power plants to meet the needs before the Susitna could come on line. Susitna power then represents an enormous glut of energy. In order to make the project economically feasible, the Corps will have to find a way to sell the excess power. Their proposed solution is rapid industrialization and the introduction of some highly energy intensive industries to the railbelt. Some of their proposals are a bauxite processing plant, a uranium enrichment plant, mineral processing plants, coal gasification plants, liquid natural gas plants, oil refineries, etc. Not only is this highly speculative, but such industrialization is totally incompatible with the expressed opinions of the majority of Alaskans who do not desire rapid large-scale industrial growth. The Susitna Project, in fact, represents a de facto imposition of an accelerated growth plan upon Alaska which is totally contrary to Alaska's desire for planned growth and control over the future. No consideration appears to have been given to the impact which doubling and tripling the population in less than 20 years will have on land use in the railbelt area and the large increase in hunting pressure in the surrounding region and throughout the State, nor to the environmental impact of such large industrialization to the railbelt area.

THE ECONOMIC FEASIBILITY OF THE SUSITNA PROJECT IS HIGHLY QUESTIONABLE

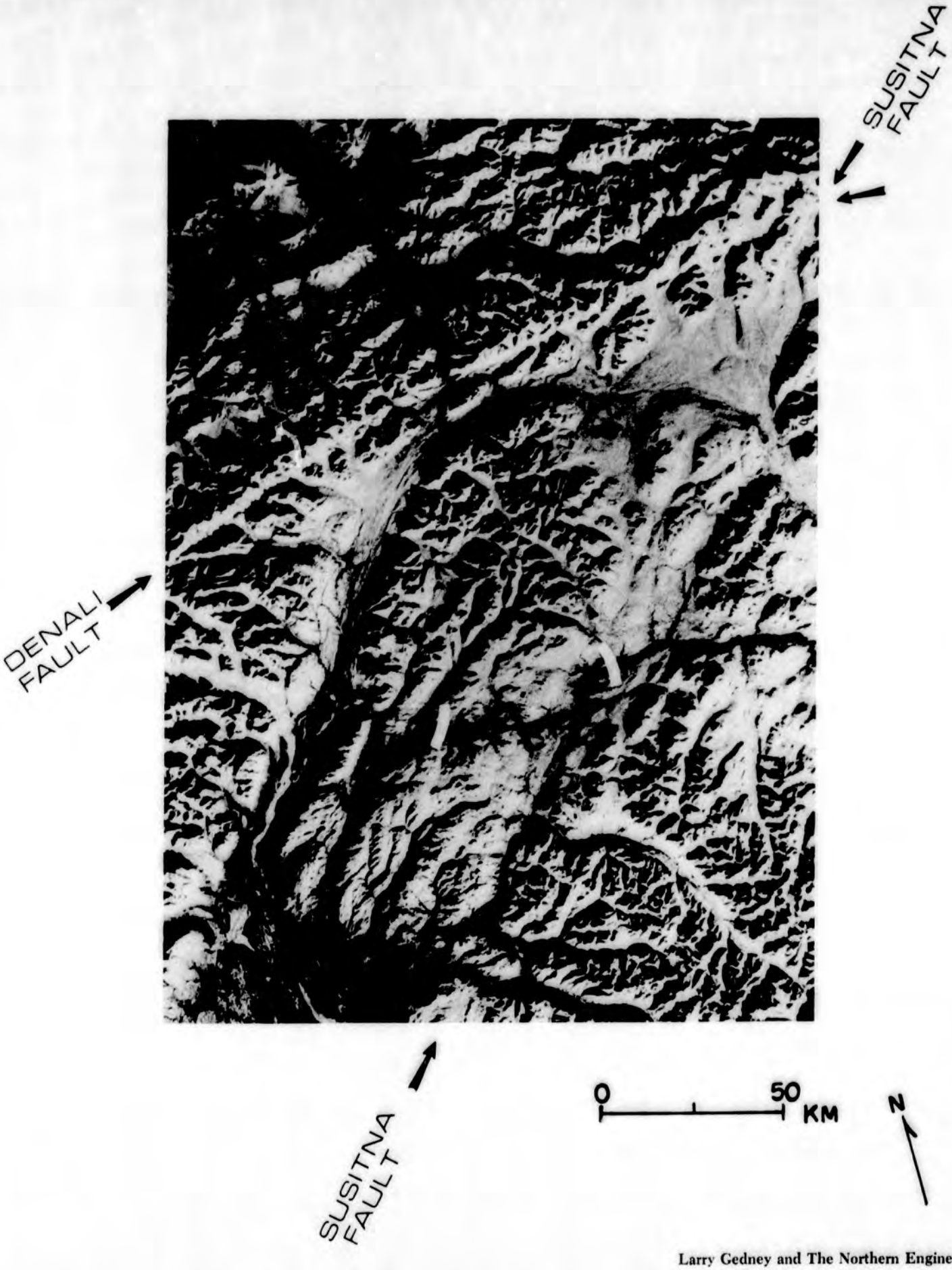
Even when using the Corps' very conservative cost estimate of $2.6 billion, economic feasibility has been judged as marginal. The Susitna Project would involve two dams, each one larger than the Hoover Dam. The project would be the biggest and most expensive ever attempted by the Corps. It would also be the first large-scale hydro-project ever attempted by the Corps in a subarctic region, an environment notorious for its engineering difficulties. Compounding the engineering problems is the fact that the dam sites will be located in a highly active seismic region. Dealing with such problems can easily lead to significant cost overruns on the project.

The Office of Management and Budget (OMB) has shown that if the Susitna Project has a cost overrun of as low as 30 percent, the benefit-cost ratio would be less than unity, making the project economically unfeasible. The Snettisham Dam in Juneau, Alaska, had a cost overrun of 36 percent, over and above inflation, and it was a much smaller project. A study made for the U.S. Senate showed that large custom engineering projects, such as Susitna, have cost overruns, over and above inflationary costs, of between 50 and 500 percent. In Alaska, the best cost estimates for construction of the oil pipeline, *based on all the final environmental stipulations*, was $2.5 billion. The end costs were $9 billion, a cost overrun of 300 percent.

Several additional hidden costs have not yet been brought up or discussed by the Corps. For example, the Susitna Project is going to be a highly centralized source of electrical energy. The major metro area, Fairbanks and Anchorage, and communities along the railbelt cannot and will not rely solely on this source; otherwise they would become vulnerable to any malfunction at the dam sites or along the power links. In fact, the utilities are required by Federal law to have reserve power on hand equal to the largest generating plant on the line. Such backup electrical generation systems will have to be built and maintained, and will add significantly to the overall costs of the project.

Such costs have not yet been factored into overall cost-effectiveness and neither have the additional costs of engineering the dams against large earthquakes and a subarctic environment. There are also many of us who feel that the costs of environmental damage and potential hazards should be factored into the equation. For example, almost 40 percent of Cook Inlet's salmon harvest comes from the Susitna River. This is more than a $15 million per year industry, almost 5 percent of the yearly benefits of the dam project at peak production. Recent research by the Alaska Department of Fish and Game has indicated that severe impacts to the fishery may occur with the construction of the dams.

We, as Alaskans, are deeply concerned about who will have to pay the inevitable cost overruns associated with a project of such massive scale. If the Federal government does not foot the bill of cost overruns, then the burden must inevitably fall onto the Alaskan railbelt electrical utility rate payers, and with



Larry Gedney and The Northern Engineer

the strong possibility of State government involvement, onto all Alaskan taxpayers.

THE POTENTIAL SEISMIC RISKS ARE SIGNIFICANT

The seismic hazards come from two factors. The first is that the two huge dams and their associated reservoirs will be located in an area that is well-recognized for its high degree of seismic activity. The second is that the reservoirs themselves can induce seismic activity.

Much of the present seismic activity in the region appears to be connected to the well-known Denali fault system. This fault lies between 40 to 50 miles from the proposed dam sites and follows an arcuate path to the north and west of the Susitna basin (see accompanying map).

Of greater concern is the recently recognized Susitna fault, an active fault which crosses the Susitna River immediately west (less than 5 miles) of the proposed site for the Watana Dam. At least five moderate earthquakes (and many smaller ones) have occurred on or near this fault within the past six years. The fault extends from the Susitna Glacier in the Delta Range to south of the Talkeetna River, a distance of over 60 miles. This region is a zone of crustal weakness and the fault is thought to be acting as a splay off the Denali fault system.

Compounding the problem of the natural seismicity in the area will be the loading caused by the impoundment of water behind the dams. It is a well-known fact that reservoirs commonly induce seismicity. Rather severe earthquakes, up to magnitude 6.4, have accompanied the filling of reserves at a number of dams around the world including places which had previously been aseismic. In one case, a reservoir-induced earthquake at Konya Dam in India caused severe property damage and the loss of 200 lives.

The Susitna dams and their reservoirs will lie on opposite sides of the active Susitna fault with the upper part of the Devil's Canyon reservoir actually overlying a portion of the fault. The high loading and water from these reservoirs could very possibly trigger strain energy which had been stored in the rocks prior to impoundment and could result in a massive earthquake whose epicentral region is likely to lie within the immediate vicinity of the Susitna dams.

The following is a quote from J. P. Rothe's "Fill a Lake, Start an Earthquake," *New Scientist*, 39, 75-78, 1968:

> It is by now clear that one can cite specific cases where tremors, some of which are severe enough to produce extensive damage, are caused by the construction of dams. When he builds these, Man plays the role of the Sorcerer's Apprentice: in trying to control the energy of rivers, he brings about stresses whose energy can be suddenly and disastrously released.

Wendell V. Mickey, who was Chief of the Seismology Division of NOAA, recommended that "no dam should be built within the disturbed zone of an active fault."

If a huge earthquake causes physical damage to either dam, the potential exists for massive floods to sweep down the lower Susitna River. Such floods could swamp the Parks Highway and the Alaska Railroad and devastate the communities along this transportation corridor – Gold Creek, Talkeetna, and others. Even if direct physical damage does not occur to the dams, earthquake-generated ground motions and landslides into the reservoir could generate tsunami-like waves that could overtop the dams and result in flooding down the river. The earthquake itself could also cause direct damage to communities near the epicenter.

The Corps claims they have upgraded their design so that the dams will withstand an 8.5 magnitude earthquake whose epicenter is 40 miles away and is at a depth of 20 miles. More recently, the Corps has finally recognized the severe seismic hazard in the immediate vicinity of the proposed dam sites. Much of their proposed Phase I feasibility study centers around exploring this problem.

It's debatable whether the Corps can really design the dam structures to withstand the severe ground accelerations near the epicenter of a large earthquake and still preserve the overall cost effectiveness of the project. The more massive the structure, the more likely it will be able to withstand an earthquake, but size can add considerably to the costs.

A further problem, and a potentially more serious one, is that there is no way to fully evaluate beforehand the effect that reservoir loading will have on the active Susitna fault. This can only be done during the actual filling of the reservoir. If the impoundment of water at Watana and Devil's Canyon begins causing an increase in the frequency and intensity of earthquakes, the Corps will most certainly be compelled, in the interests of public safety, to stop the filling of the reservoirs.

Earthquakes could be induced even after the reservoirs are filled, particularly if there are large fluctuations in water level. Such fluctuations will occur yearly at Susitna because during the peak energy demand months, the winter months, water flow into the reservoirs will be lowest.

Most Alaskans are not prepared to take the almost inevitable seismic risk in order to secure electrical energy whose need has yet to be demonstrated.

THE SUSITNA PROJECT POSES A SIGNIFICANT THREAT TO THE REGION'S FISHERIES AND WILDLIFE

We believe that the effects of the Susitna Project on fisheries and wildlife have been severely underplayed by the Corps. Our brief talks with biologists have alerted us to the probability that the project could drastically reduce the Susitna River's salmon production, seriously reduce Nelchina Basin moose and caribou stocks, and, as a result, decrease recreational opportunity while simultaneously increasing local recreation pressures on remaining wildlife. A full and careful evaluation of these aspects must be undertaken by competent people BEFORE getting into the Susitna Dam Project.

More than 20 percent of the State's total moose harvest comes from the game unit surrounding the proposed Susitna Project. The Alaska Department of Fish and Game considers the Nelchina Basin, within which the Susitna Project will be located, one of the most important game areas in the State, providing large numbers of game animals and roadside access for hunters and viewers. A very significant part of fall and winter moose habitat used by moose in this unit would be covered by the impoundments. This could mean a considerable reduction in moose numbers which would limit hunting and viewing opportunities.

The calving grounds for the Nelchina caribou herd (20,000 animals) are near the proposed impoundment sites. Movement of animals to and from the calving ground could be impeded by the reservoirs. Considerable mortality to the herd could result during the crossings. More likely, as with reindeer in Norway, they may cease migrating. The ensuing limitation of range can be expected to cause a drastic plunge in their population. Most non-migrating herds number in the hundreds. The feasibility study itself could adversely affect the caribou herd. The study would build a road to the dam sites, creating access for many people. Ensuing trails could lead people directly into the calving grounds. In 1978 close to 3,000 people applied for permits to hunt the Nelchina caribou herd.

Adjacent to these lands, in McKinley Park, the McKinley caribou herd has deteriorated badly. It is questionable whether it will ever recover. The Nelchina caribou herd of 20,000 animals is really the only other herd of account in the Interior. With the pipeline already affecting the Western Arctic herd and the threat of oil and gas development in the Arctic National Wildlife Range that could disastrously affect the Porcupine

herd, we may find in the future that the Nelchina herd is of national significance.

Thirty-eight percent of the Cook Inlet salmon harvest comes from the Susitna. The Susitna River is the *highest* producer of all salmon species flowing into Cook Inlet, save the sockeye. It is the second or third highest producer of sockeye salmon. In the winter the Susitna runs clear, and thus it is satisfactory for the rearing of juvenile salmon *which move into it at that time*. The dam would probably cause the winter waters to run silty and thus would be unsatisfactory for that purpose. This condition would affect the entire length of the river down to the mouth. Also, the probable decrease in water level downstream from the dam to the mouth during summer would reduce the existence of and access to spawning sites.

AN ADEQUATE ANALYSIS OF ALASKA'S CHOICES OF ALTERNATE ENERGY PATHS HAS NOT BEEN MADE

To construct and become dependent upon a single, centralized energy source is contrary to what we consider to be good energy planning for Alaska. Rather, we feel that energy sources should be decentralized and varied. Several alternatives are available for Alaska and need to be investigated in greater detail before becoming locked into a Susitna Project. At least 32 alternate smaller-scale hydro-power sites have been identified in the Alaskan railbelt area. Indepth studies of these potential hydro-sites is conspicuously lacking. To our knowledge, only cursory studies have been made and these were done during the late 1940's. Smaller-scale hydro holds a distinct advantage over Susitna. Such projects could come on line much sooner and could be incremented in to meet energy demands as they occur. We feel that a thorough evaluation of this alternative hydro-power path is needed before proceeding with Susitna.

Proper insulation of homes and businesses and other conservation measures can lead to tremendous savings of energy. Further, although many people find it hard to believe, solar power in Alaska is becoming increasingly practical. New homes are being designed to take advantage of passive solar heating and solar heated water tanks in the Fairbanks area have been shown to be competitive with electrically heated water tanks. Because they are labor intensive, such conservation alternatives can significantly increase local employment. Furthermore, purchase of construction materials for such improvements would greatly benefit local business and add to the diversification of local economies.

The New Carter Water Policy requires that the federal agency considering a dam must prepare a nonstructural or demand reducing alternative. No effort has been made by any agency to do this.

SUMMARY

We feel that the Army Corps of Engineers, the Alaska Power Administration, and the Alaska Power Authority (a state agency) are overstepping the bonds of their authority in their attempts to circumvent the State's planning process, by trying to impose an energy policy onto the State. We further feel that the seriousness of the problems regarding economic feasibility, financing, geologic hazards, and environmental risks warrant delay of any action on the Susitna Project until

1. An independent evaluation of the Corps' projected construction costs, economic feasibility, financing, and geologic-environmental risks can be made.
2. Alaska's energy alternatives and choices of paths for growth and development are fully examined.
3. The Alaskan citizenry has been made fully aware of the implications of Susitna power and of what alternate choices are available.
4. The public is allowed to participate in choosing the direction in which the State is to proceed.

(The legislature has appropriated $8.2 million for Phase I studies (part of a $25 million plus study), with the condition that either there will be a guarantee of Federal reimbursement of the project studies or that private contractors rather than the Corps of Engineers will perform the work. An appropriation of $200,000 was also set up for a study of alternatives to the Susitna Dam Project. ACS and the Fairbanks Environmental Center have requested that the Alaska Council of Science and Technology oversee this independent study. – Ed.)

OUT OF THE MAILBOX

Mr. Bob Weeden
Alaska Conservation Society
Box 80192
College, Alaska 99708

Dear Bob:

I just read your ACS November newsletter, and wanted you to know how impressed I was with the level of activity you have maintained. I know a lot of it is your own hard work, but all of the folks who cover these issues should be complimented. I was surprised to see how much coverage you had achieved, and I want to encourage you to keep it up.
Best regards

Sincerely,

Guy R. Martin

Assistant Secretary
Land and Water Resources

OIL SPILL RESPONSE IN ALASKA

from U.S. Fish and Wildlife Service press release

For ten days in March 1967, the *Torrey Canyon* leaked her cargo of 117,000 tons of crude oil into the sea off the southeast coast of England. This marked the first major tanker accident in history. Almost one year following the *Torrey Canyon* incident, the Oil Spill Regional Response Team (RRT) concept was founded in the U.S. The teams consist of a few key individuals from various state and federal agencies that are trained to react to an oil spill crisis. In the event of an oil spill, three main "players" take a place on the team, a regulatory control agency, a resource agency, and a scientific coordinator.

Generally, one of four major REGULATORY AGENCIES takes the responsibility for containing and cleaning an oil spill, depending on the location of the spill. The four regulatory agencies in Alaska are the U.S. Coast Guard, the Alaska Department of Environmental Conservation (ADEC), the Environmental Protection Agency (EPA), and the U.S. Geological Survey (USGS). The U.S. Coast Guard responds to spills in coastal and marine waters, whereas ADEC responds to coastal spills within three miles of shore and inland spills. EPA also responds to inland spills, but ADEC has the primary responsibility. The U.S. Geological Survey responds to spills in Federal waters or on Federal land if the spill resulted from oil drilling operations. For example, if a spill occurs in coastal waters, the U.S. Coast Guard would assign an on-scene coordinator to supervise and coordinate the clean-up operations. The party responsible for an oil spill is obligated, according to federal law, to clean it up and compensate for damages, but this is usually not feasible since an oil spill can easily cost millions of dollars.

The Regional Response Team has identified three phases to an oil spill response: (1) Immediate response for control of the spill, (2) Containment, mopping, and clean-up of the spill, and (3) Impact assessment during and after the spill. The first two phases of the response, however, are hindered by the inherent characteristics of Alaska. Interest and response to oil spills is great in Alaska, but oil clean-up operations are drastically inhibited by Alaska's sparse population and vast size. Many of the small coastal towns just don't have the facilities for handling a major oil spill.

There are a wide variety of spill types in Alaska ranging from spills along the coast to spills on permafrost, which will require some unique techniques for clean-up and new knowledge about how different oils behave in frigid conditions.

Presently, over one hundred million barrels of oil per day are removed from Alaska and with the national energy focus on oil and gas, that figure may continue to rise. The chances of a major oil spill in Alaska continues to increase and it is not a question of whether or not a spill will occur, but rather when and where.

Alaskans have assurance, however, that steps have been taken to respond to major oil spills and to prevent a major ecological disaster. The Regional Response Team concept is a big step in the right direction.

(This step in the right direction is the consolation prize to those who survived the oil boom avalanche. – ed.)

— Boom in use at Seldovia oil spill. **USFWS**

herd, we may find in the future that the Nelchina herd is of national significance.

Thirty-eight percent of the Cook Inlet salmon harvest comes from the Susitna. The Susitna River is the *highest* producer of all salmon species flowing into Cook Inlet, save the sockeye. It is the second or third highest producer of sockeye salmon. In the winter the Susitna runs clear, and thus it is satisfactory for the rearing of juvenile salmon *which move into it at that time*. The dam would probably cause the winter waters to run silty and thus would be unsatisfactory for that purpose. This condition would affect the entire length of the river down to the mouth. Also, the probable decrease in water level downstream from the dam to the mouth during summer would reduce the existence of and access to spawning sites.

AN ADEQUATE ANALYSIS OF ALASKA'S CHOICES OF ALTERNATE ENERGY PATHS HAS NOT BEEN MADE

To construct and become dependent upon a single, centralized energy source is contrary to what we consider to be good energy planning for Alaska. Rather, we feel that energy sources should be decentralized and varied. Several alternatives are available for Alaska and need to be investigated in greater detail before becoming locked into a Susitna Project. At least 32 alternate smaller-scale hydro-power sites have been identified in the Alaskan railbelt area. Indepth studies of these potential hydro-sites is conspicuously lacking. To our knowledge, only cursory studies have been made and these were done during the late 1940's. Smaller-scale hydro holds a distinct advantage over Susitna. Such projects could come on line much sooner and could be incremented in to meet energy demands as they occur. We feel that a thorough evaluation of this alternative hydro-power path is needed before proceeding with Susitna.

Proper insulation of homes and businesses and other conservation measures can lead to tremendous savings of energy. Further, although many people find it hard to believe, solar power in Alaska is becoming increasingly practical. New homes are being designed to take advantage of passive solar heating and solar heated water tanks in the Fairbanks area have been shown to be competitive with electrically heated water tanks. Because they are labor intensive, such conservation alternatives can significantly increase local employment. Furthermore, purchase of construction materials for such improvements would greatly benefit local business and add to the diversification of local economies.

The New Carter Water Policy requires that the federal agency considering a dam must prepare a nonstructural or demand reducing alternative. No effort has been made by any agency to do this.

SUMMARY

We feel that the Army Corps of Engineers, the Alaska Power Administration, and the Alaska Power Authority (a state agency) are overstepping the bonds of their authority in their attempts to circumvent the State's planning process, by trying to impose an energy policy onto the State. We further feel that the seriousness of the problems regarding economic feasibility, financing, geologic hazards, and environmental risks warrant delay of any action on the Susitna Project until:

1. An independent evaluation of the Corps' projected construction costs, economic feasibility, financing, and geologic-environmental risks can be made.
2. Alaska's energy alternatives and choices of paths for growth and development are fully examined.
3. The Alaskan citizenry has been made fully aware of the implications of Susitna power and of what alternate choices are available.
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©

THE IJC: A ROLE IN THE ARCTIC NATIONAL WILDLIFE RANGE?

By Jane Aspnes

Alaskan Natives are vocally opposed to oil and gas exploration in the Arctic National Wildlife Range calving grounds. Kaktovik residents have submitted a resolution specifically requesting that no exploration be allowed. Residents of all the other villages neighboring the Range have requested wilderness status for the area. Wilderness status would ban mineral or petroleum exploration.

But the Arctic National Wildlife Range no longer concerns just Alaskans. It became a binational venture in July 1978 when Canada set aside 9 million acres adjacent to 8.9 million acres already withdrawn by the U.S. in 1960. Two primary reasons were given by the Canadians for their addition to the Range: to protect the wildlife (primarily the Porcupine caribou herd which migrates between Canada and the U.S.) and to protect native hunting, trapping, and fishing activities. Consequently, management and land use decisions for any part of the Range, U.S. or Canadian, have an international impact.

The U.S. and Canada are presently developing a management plan for the total area. However, this plan will include recommendations only. It will not provide a legal framework for negotiating disputes that might arise from acts of Congress. There is one organization though, that does provide an impartial system for resolving border disputes: the International Joint Commission (IJC). Other states and provinces that share a common border have found that the IJC is the best mechanism for dealing with transboundary environmental issues.

The IJC's existence began in 1909 when the U.S. and Canada agreed to the Boundary Waters Treaty. A six-member International Joint Commission of Inquiry is empowered under the 1909 treaty. The treaty gives two areas of responsibility to the IJC: investigative and adjudicative. Judicatory responsibilities involve permission authority over projects affecting the level of boundary waters. Investigative responsibilities involve studying a problem and making recommendations to the governments. Alaska is the only state bordering Canada that has not used the IJC to investigate and make recommendations on transboundary issues.

The initial response of a state or province faced with border problems might be to step across the border to the capital and talk directly to the other party. However, Article I, section 10 of the U.S. Constitution specifies that a state cannot enter into any treaty alliance or confederation. Therefore, any bilateral negotiations or plans concerning the Arctic National Wildlife Range must include Washington, D.C., and Ottawa in the process.

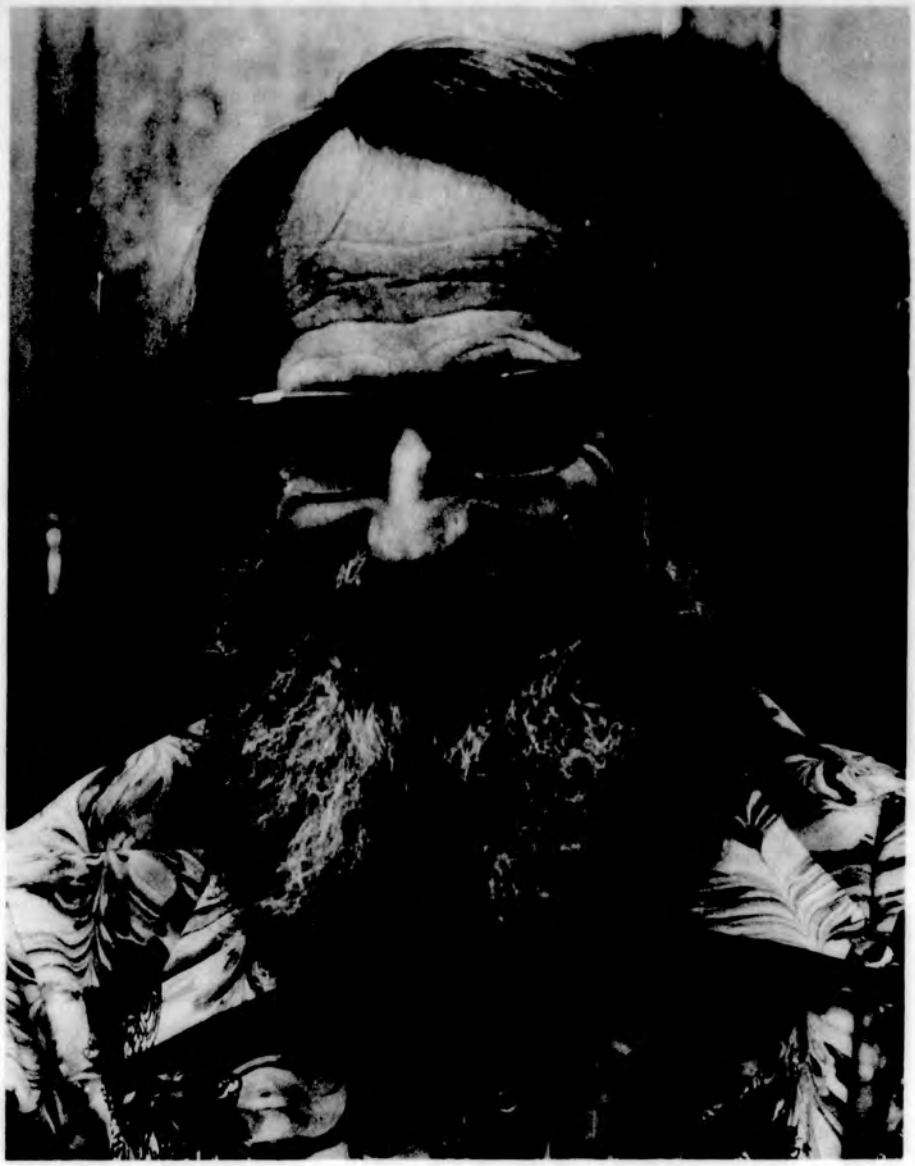
The original intent of the Boundary Waters Treaty was to prevent disputes over water apportionment and development. However, Article IX of the treaty gives the right to investigate "any other questions or matters of difference." This clause has recently enabled the IJC to study air pollution problems. Commissioner Max Cohen has stated, "border problems are an interaction of air, land, and water," thus expressing the IJC's interest in land use planning. The involvement of the IJC in Wildlife Range management issues would set a precedent, but is legal under Article IX.

There are advantages to involving the IJC. First, it insures that a problem will be studied. Secondly, it provides an impartial recommendation on the situation based upon the study and public hearings. It should be stressed that the members of the commission serve impartially and are not negotiators. The process does take time, often three to five years on a single issue, which can be viewed as an advantage or disadvantage depending upon one's point of view.

Historically, the IJC has an excellent record. In most cases closely. A few cases have remained unresolved because both governments chose to do nothing. But, most importantly, it gives both sides a chance to be heard on a issue.

©

RABBIT WILL NOT
USE FORELEGS TO
HOLD DOWN FOOD, EVEN
IF CONVENIENT
CAMP BEAR PAW, TAHOE NAT. FOREST
AUG. 8, 52



VISIONS OF UNICORNS:

A TRIBUTE TO BILL BERRY

By Mary Shields

Alaska's spring birches and autumn bearberries, Her noble moose and busy red-backed voles, Her people and Her future generations will miss the presence of Bill Berry. Those of us who knew Bill personally, and those of us who knew, or will know him through his artwork, will cherish the precious gifts he gave us. Bill shared his sensitive understanding of the beauty, joy, and humor of life. He helped us to see the little things around us and by his example we learned we were not looking closely enough. He inspired us to look for unicorns, and thanks to his friendship, more of us spy them every day. We see a unicorn with our hearts and Bill will always be there with each new sighting. Our hearts will ache a little each time, but will live and grow more joyfully because Bill helped us to look.

WOODSMOKE

by Ginny Hill Wood

Spring sprang so fast in Interior Alaska this year we were deprived of that usual euphoric interlude when there is nothing to do but watch the snow melt, the daylight lengthen, and the good earth appear. During this period, the summer ahead seems to stretch endlessly on into the future with plenty of time for contemplating fishing, floating, or backpacking trips, plus all the improvements we are going to make this year around the homestead before fall.

But instead, one day we were still in winter with two feet of snow in the woods; then hardly more than a week later, there was the bare ground baking under 72 degrees of sunshine. We scarcely had time to put away skis, snow shovels, and longjohns before we had to take off the studded tires, get out the rakes and hoes, and try to remember where we put our shorts.

We are never ready for what happens even when we know what happens is inevitable. Like our latest crude oil crises. The print was barely dry on a Fairbanks Daily News-Miner editorial exhorting Alaskans to join Wyoming's rebellion against the federal government's 55 mph speed restriction (left over from our 1973 energy crisis) when the shortage of fuel at the pumps was making headlines again.

This occurred while we were still trying to make sense out of the Alice-in-Alaskaland situation of that frenetic push to get a Prudhoe Bay to Valdez oil pipeline built (and damn the cost, the caribou, and the conservationists – full steam ahead!) only to find West Coast refineries saturated with the gooey stuff and maybe it should be peddled to Japan in exchange for their oil allotments from the Arabs being delivered to our thirsty east coast refineries. We puzzled over how this Japanese/Middle East/U.S. connection jibed with the cry for freedom from foreign oil dependence that drowned out consideration of a trans-Canada pipeline route (can't trust those foreigners, y' know!) which would have delivered crude to eastern refineries to begin with.

Then the Shah of Iran was deposed and the oil derricks there stopped pumping while new potentates took over. One week California refineries were glutted, then a few weeks later the stoppage of 6 percent of our oil imports caused long lines of motorists at the gas pumps and "out-of-gas" signs at service stations in the same state.

Shortly after the "incident" at Three Mile Island, the April RURALITE, the monthly freebie distributed by the Golden Valley Electrical Association and other publicly owned rural electric utilities in Oregon, Washington, Idaho, Alaska, and Nevada, was delivered to my mailbox. In it was an editorial which scathingly attacked environmentalists, "no-growthers," soft energy freaks, and nuclear power plant protestors who "seek to revolutionize American society and turn us into a nation of nut gatherers."

RURALITE also reported the following:

"Rep. Mike McCormack of Washington says solar cultists are deliberately misleading the American people when talking about getting 20 percent of energy needs from solar by the year 2000. McCormack, who is chairman of the House Science and Technology Subcommittee on Advanced Energy, says we will be lucky if we get 4 percent. He said that the Council on Environmental Quality talks about 25 percent. 'They are worshiping something without facts." McCormack added that 'these solar cultists want the USA to commit energy suicide.' "

Well, out to the garden. Seeds are still something one can depend on – and maybe, also, firewood and your bicycle.

COCK SPRUCE GROUSE ON DISPLAY GROUND - FLYING UP INTO LOWER BRANCHES OF SPRUCE (ANY OF SEVERAL TREES IN AREA) WITH WHIRRING, LOBBED FLIGHT; FLYING DOWN AGAIN — ALMOST A HOVER AS BIRD DROPPED TO FOREST FLOOR (ABOVE); AND STRUTTING BRIEFLY BEFORE REPEATING THE PERFORMANCE. FOLDED WINGS FLICKED OUTWARD RAPIDLY OCCASIONALLY AS BIRD STRUTTED (TOP, LEFT).

MAY 13, '62, DENEKI LAKES, ALASKA.
(COMPLETED MAY 16, FROM MEMORY AND REF)

All drawings in this issue are by Bill Berry with the permission of Liz Berry.

The Alaska Conservation Society

ALASKA CONSERVATION SOCIETY
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Brian Rogers
Box K
College, AK 99708

A.1.1 - Introduction

This Plan of Study has been prepared by Acres American Incorporated in response to the Request for Proposal issued on June 25, 1979, by Mr. Eric Yould, Executive Director of the Alaska Power Authority. It includes significant contributions from other firms who would generally be involved as subcontractors in the event that a contract to undertake the study itself is awarded to Acres American Incorporated. Major participants in the Acres team include R&M Consultants, Inc.; Woodward Clyde Consultants; Terrestrial Environmental Specialists, Incorporated; Cook Inlet Region Incorporated/ Holmes and Narver, Incorporated; Salomon Brothers; and Frank Moolin Associates.

The gestation period for giant projects tends to be long. Wild bursts of enthusiastic effort followed by periods of genuine apathy (or total despair, depending upon whose vantage point is selected) are common. Development of the Susitna River has so far followed that classic pattern.

As early as 1952, the Bureau of Reclamation published a report identifying a large number of potential hydroelectric power sites in Alaska, noting pointedly the strategic advantages enjoyed by the Susitna River because of its proximity to Anchorage and Fairbanks. Even then, Devil Canyon was perceived as the place to install a large dam. It was--and is--a steep, narrow rock walled canyon through which silt laden grayish waters swirl and churn and turn to white froth as they rush for the sea. Updates by the Bureau led to proposed authorization in 1961 of Devil Canyon and Denali--a site far up-river of Devil Canyon, astride extensive wet lands and marshy areas, where the Susitna draws strength from relative placidity before it attempts the inevitable plunge through miles and miles of canyons.

Another giant project was under active contemplation in the early sixties and its mind boggling size, together with the engineering challenges it offered, were especially exciting in a brand new state and during the space technology wars then being waged. The Rampart hydro project would have created a pool larger than the State of Connecticut if it had ever been built.

While the Rampart studies put the Susitna project in limbo for a while, a number of long time Alaskans worried about the risks of such a venture. As fate and thoughtful argument would have it, Rampart is unlikely to be built at any time in this century.

Susitna was delayed long enough, though, to allow for discovery and development of then economical natural gas production. By the time the warnings of energy doomsayers were beginning to be heard and felt in 1973, the Susitna project once again began to appear attractive. The Bureau of Reclamation updated its earlier studies in 1974, recommending a four dam system, and the U. S. Army Corps of Engineers launched a major pre-feasibility study which led to a recommendation in 1976 by the Chief of Engineers that the Susitna Project be authorized. The Corps plan recommended two high dams, the first of which would be built as a massive earthfill gravity structure 810 feet in height at the Watana site more than

from Acres American proposed Susitna Plan of Study

30 miles upstream of Devil Canyon. The second Corps dam was to be 635-foot high thin arch concrete structure which would sweep across the canyon from rock abutment to rock abutment -- essentially the same as the Bureau's Devil Canyon proposal.

By June 1978, the Corps of Engineers had prepared a Plan of Study requiring 24 million dollars and offering a program leading to completion of a detailed feasibility study. Further investigations by the Corps confirmed the adequacy of the Watana site, though they did reveal that some changes were required in particular for the spillway arrangement. As the situation now stands, provided that the necessary appropriations are made, the State of Alaska could choose to proceed along a course of action which leads to a study undertaken by the Corps and reimbursed by the State. A unique risk protection feature would permit the return of State funds in the event that feasibility is not shown.

The alternative to further federal involvement in the Susitna project is a scenario which includes selection of a private engineering firm as the State's consultant. Qualifications have been reviewed by the State for all those interested firms with strong hydroelectric development capabilities and three have been engaged to prepare a Plan of Study detailing the steps necessary to permit filing a license application to the Federal Energy Regulatory Commission (FERC). This Plan of Study describes a series of tasks and subtasks, along with reasons for these, as well as providing information regarding organizational matters and team qualifications.

A.1.2 - Primary Objectives of Study

(i) Establish technical, economic and financial feasibility of the Susitna Project to meet future power needs of the Railbelt Region of the State of Alaska.

(ii) Evaluate the environmental consequencs of designing and constructing the Susitna Project.

(iii) File a completed license application for the project with the Federal Energy Regulatory Commission.

A.1.3 - Specific Objectives of the Study

To meet the primary objectives of the study, the following specific objectives are proposed:

(i) Determine the future electric power and energy needs of the Southcentral Railbelt Area.

(ii) Assess alternative means of meeting the load requirements of the Railbelt Area.

(iii) Prepare an optimal development plan for the Susitna Project wherein power costs and probable impacts are minimized, safety is enhanced, and financing is achievable.

(iv) Establish a definitive estimate of the total cost of bringing power on line, together with a statement of cash flow requirements.

(v) Evaluate the physical, economic, and financial risks of the Susitna Project and determine ways and means to avoid or minimize their consequences.

(vi) Evaluate existing environmental and social factors as they now exist in the proposed project area, assess the impacts of the proposed project, enhance environmental values to the extent possible, and recommend mitigating measures.

(vii) Estimate the annual system power costs in the Southcentral Railbelt Region with and without the project, study the integration of Susitna power into the Railbelt utility systems, and assess power marketability.

(viii) Prepare a complete license application and file this with the Federal Regulatory Commission.

(ix) Ensure that the needs and desires of the public are known, keep interested parties and the public informed, and afford an opportunity for public participation in the study process.

(x) Determine an optimal program for achieving financing, including resolution of issues regarding tax-exempt status of bonds which may later be offered.

(xi) Minimize the financial risks and expenditures which must be incurred by the State of Alaska in pursuit of the above objectives should development of the Susitna Project prove to be not in the best interests of the State.

(xii) Maximize opportunities for equal employment opportunities for Alaskans and for involving in the work members of those Native Corporations in the region.

A.1.4. - Primary Aspects for Susitna Requiring Study

(i) Introduction

As with any major hydroelectric project, the number of investigations and substudies required to achieve the primary objectives noted in paragraph A.1.2 above is significant. Each of these requirements is described in terms of precise tasks and subtasks in Section A5. Even so, a number of primary aspects, particularly insofar as they address major concerns, deserve to be highlighted. Thus certain key areas of the study are highlighted in succeeding subparagraphs.

(ii) Power Studies

While this Plan of Study had necessarily to be written on the assumption that project feasibility will in fact be demonstrated, we are well aware of the importance of demonstrating that a need for significant increases in power generating capacity does truly exist in the Railbelt Area and that this need can best be satisfied by the Susitna Project. Indeed, it is clear that the absence of need or the discovery of a better means of satisfying it if it exists will represent prima facie evidence that development of the project is not in the best interests of the State. Power studies will be undertaken to examine and define a range of load forecasts and to assess possible alternatives or groups of alternatives which together could satisfy the projected demand.

We will avail ourselves of intimate knowledge of Alaska in general and the Railbelt in particular through employment of the Alaskan office of Woodward-Clyde Consultants (WCC) to undertake load forecasting studies. WCC in turn has arranged for consultation from the University of Alaska, particularly for use of their econometric models. The study of non-hydro alternatives by WCC (reviewed by Acres' Thermal Power Division) and of hydro alternatives by Acres will be enhanced through use of the General Electric Optimum Generation Program, Series V (sophisticated computer models designed to permit multiyear analysis of generation system mixes) which we have successfully used in the past for a comprehensive study of alternatives to the Dickey-Lincoln School Lakes Project in New England.

(iii) Financing Plan

Successful financing of giant projects is inevitably a complex and time-consuming task. Our own expertise in this area, as evidenced by participation in the successful financing of the Churchill Falls Project where Mr. J. G. Warnock managed the team responsible for bond support documents, will be available to our financial consultants, Salomon Brothers. This well known investment banking firm has managed or co-managed 655 issues of tax-exempt bonds in the total amount of $48.3 billion since January 1, 1974. Dr. C. P. Chapman will manage risk analysis studies. His unique special capabilities in that area have been demonstrated time and again for large projects including some in subarctic environments.

(iv) Ice Engineering

The study of ice engineering has necessarily been an important part of Acres' efforts for past projects in recent years. Our successful involvement in hydroelectric projects throughout North America, with a total installed capacity of over 14,000,000 kW, is a matter of record. Assistance in ice engineering studies will be provided as well by R&M whose hydrologic investigations of rivers and streams throughout Alaska has been significant. Our conceptual designs for

minimizing the problems associated with frazzile ice, ice jams, ice shelving and the like will be subjected to exhaustive modeling after license application has been made and during the preparation of detailed designs. Problems associated with permafrost are also familiar to the Acres organization: our staff have extensive experience in developing unique and effective methods of dealing with such problems in connection with large power projects in subarctic regions.

(v) Earthquake Engineering

Of the many potential risks associated with the Susitna Project, those associated with seismic problems are probably the most significant. Certainly, no single area of concern is likely to have more immediate catastrophic consequences if the engineering work has not been done thoroughly and well. Not only is it important to design all structures to survive unscathed in the event of an earthquake, but it is also essential to determine the extent to which creation of reservoirs on the Susitna River will itself induce earthquakes.

Our approach to this problem is twofold: first, we have engaged the services of the California office of WCC to undertake extensive seismic studies. WCC has operated in Alaska for over ten years and has amassed a considerable data base on geological and geotechnical conditions, faulting, and seismicity of the Anchorage and Railbelt Areas. WCC have also had extensive seismic experience with major dam and power projects elsewhere. Second, we have recommended a list of eminent professional engineers whose accomplishments are recognized worldwide as the basis for selection by the Power Authority of one or more external review boards. The engineering board would be provided funds on the order of $1 million with which to undertake confirmatory or additional seismic studies. Acres would offer coordination services and administrative support, where appropriate, to the board(s), but authority to select, remunerate, terminate and to direct their activities would remain with the Power Authority.

(vi) Project Management/Construction Management

In order to provide Alaskan-experienced project and construction management capability in the POS team, Acres will combine with its in-house resources the additional resources of the Frank Moolin and Associates, Inc. organization. This company presently operates out of Fairbanks, Alaska and provides executive project and construction management experience to the energy industry. The Moolin team provides many years of "hands-on" experience on varying sizes and types of projects, including recent responsibility for construction of the Trans-Alaska Pipeline, a $4.2 billion effort. Members of the organization provide an unusual, multi-disciplined, combination of energy, industry and heavy construction experience. In addition, conditions unique to planning, managing and constructing projects on the Alaskan scene are familiar to all of these individuals.

Wittow

Date: February 20, 1979

Memorandum to ACS Board members and other interested parties

From: Roman J. Motyka

Subject: Susitna River Dams Project (SRDP)

Several of us are trying to put together a question and answer fact sheet on the Susitna project and the proposed State funding of the Phase I Army Corps of Engineers feasibility study. We would appreciate your review of the following series of questions and answers and any comments you may have on them.

The first question and answer is taken verbatim from the February 16, 1979, edition of the Fairbanks Daily News-Miner (I have copies of the entire article for those who are interested):

Q. What is the Sustitna River dams project?

A. " As proposed by the Army Corps of Engineers in 1976, the project would eventually consist of two dams on the upper Susitna River. The first dam, Watana, would go in about 100 miles upstream from Talkeetna. An earthfill structure, it would be 810 feet high and would create a resevoir 54 miles long. It was proposed to go on the line in 1994. Next would be the Devil Canyon dam. It would be 635 feet high and would be built of concrete. It would sit 32 miles downstream from Watana, and is envisioned to go into operation as soon as needed--tentatively about 1999 but perhaps concurrently with its big sister if the need were there. A transmission line would be strung from Fairbanks to Anchorage as part of the project. Hooked into the power plants at both dam sites, it would take about 75 percent of the power south and the rest north. The two dams could produce 6.1 billion kilowatt hours "firm annual energy." The railbelt's present consumption, excluding industrial and national defense energy, is about 2.8 billion KWH. "

This question and answer (Q & A) gives a good introductory statement as to what SRDP is all about. However, the last paragraph is highly misleading and needs to be changed. The energy figures quoted, 2.8 billion KWH, is the total energy consumption and not just electrical. At present the data upon which APA bases this figure is unavailable and needs to be researched. It probably includes all fossil fuel used to generate electricity and to heat buildings. It may also include transportation of energy, i.e., cars, trucks etc.

I've checked an independent source (an ISER report on Alaska's electric power requirements, June 1976) which gave the total electrical energy consumption in 1974 for the combined Fairbanks and Anchorage metro areas at about 1.2 billion KWH. This figure includes industrial users.

If we use a projected growth rate of at most 9% per year, this would give a total of 1.7 billion KWH electrical energy consumption for 1978. Industrial usage is probably at least 30% of the total so that the actual electrical energy consumption by residential and small commercial users is probably on the order of 1.2 billion KWH compared to 2.8 billion KWH quoted in the above article.

The reasons why using the total energy consumption figures to justify the SRDP is totally inappropriate and misleading are the following: The total energy figures include fossil fuels used to generate electricity. The use of fossil fuel-generated electricity for home heating is notoriously inefficient--perhaps less than 30%. Furthermore, the total energy figure includes fossil fuels being used to directly heat buildings.

The continued use of direct fossil fuel heating, increased energy conservation, home insulation, plus increased reliance on passive solar heating are all likely to reduce reliance on electric heating in the future*. Thus using total energy consumption leads to a large overestimate of electrical energy needs.

The last paragraph in the above Q & A might more accurately read:

"The railbelt's present electrical energy consumption rate, excluding industrial and national defense energy, is about 1.2 billion kilowatt hours. According to Army Corps of Engineers and the Alaska Power Authority, the two dams will produce 6.1 billion KWH of 'firm annual electrical energy.' This is over 5 times the present rate of residential and small commercial user electrical energy consumption.

Q. What are the geologic and environmental risks associated with the Susitna River Dams Project?

A. There are several with the <u>seismic hazard</u> being the most prominant. The seismic hazards come from two factors. The first is that the two huge dams and their associated reservoirs will be located in an area that is well-recognized for its high degree of seismic activity. The second is that the reservoirs themselves can induce seismic activity.

Much of the present seismic activity in the region appears to be connected to the well-known Denali fault system. This fault lies between 40 to 50 miles from the proposed dam sites and follows an arcuate path to the north and west of the Susitna basin.

Of greater concern is the recently recognized Susitna fault, an active fault which crosses the Susitna River immediately west (less than 5 miles) of the proposed site for the Watana dam. At least 5 moderate earthquakes

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* In fact, the recent trend away from total electric homes has been so strong that GVEA in Fairbanks has more electrical energy than it can sell and recently cancelled its plans to build a new Healy coal plant.

(and many smaller ones) have occurred on or near this fault within the past six years. The fault extends from the Susitna Glacier in the Delta Range to the south of the Talkeetna River, a distance of over 60 miles. This region is a zone of crustal weakness and the fault is thought to be acting as a splay off the Denali fault system.

Compounding the problem of the natural seismicity in the area will be the loading caused by the impoundment of water behind the dams. It is a well-known fact that reservoirs commonly induce seismicity. Rather severe earthquakes, up to magnitude 6.4, have accompanied the filling of reserves at a number of dams around the world including places which had previously been aseismic. In one case, a reservoir-induced earthquake at Konya Dam in India caused severe property damage and the loss of 200 lives.

The Susitna dams and their reservoirs will lie on opposite sides of the active Susitna fault with the upper part of the Devil's Canyon reservoir actually overlying a portion of the fault. The high loading and water from these reservoirs could very possibly trigger strain energy which had been stored in the rocks prior to impoundment and could result in a massive earthquake whose epicentral region is likely to lie within the immediate vicinity of the Susitna dams.

The following is a quote from J. P. Rothe's "Fill a Lake, Start an Earthquake," New Scientist, 39, 75-78, 1968:

> "It is by now clear that one can cite specific cases where tremors, some of which are severe enough to produce extensive damage, are caused by the construction of dams. When he builds these, Man plays the role of the Sorcerer's Apprentice: in trying to control the energy of rivers, he brings about stresses whose energy can be suddenly and disastrously released."

If a huge earthquake causes physical damage to either dam, the potential exists for massive floods to sweep down the lower Susitna River. Such floods could swamp the Parks Highway and the Alaska Railroad and devastate the communities along this transportation corridor--Gold Creek, Talkeetna and others. Even if direct physical damage does not occur to the dams, earthquake-generated ground motions and landslides into the reservoir could generate tsunami-like waves that could overtop the dams and result in flooding down river.

The earthquake itself could also cause direct damage to communities near the epicenter.

Q. What does the Army Corps of Engineers plan to do about the seismic hazards problem?

A. The Corps claims they have upgraded their design so that the dams will withstand an 8.5 magnitude earthquake whose epicenter is 40 miles

away and is at a depth of 20 miles. More recently the Corps has finally recognized the severe seismic hazard in the immediate vicinity of the proposed dam sites. Much of their proposed Phase I feasibility study centers around exploring this problem.

It's debatable whether the Corps can really design the dam structures to withstand the severe ground accelerations near the epicenter of a large earthquake. The more massive the structure, the more likely it will be able to withstand an earthquake, but size can add considerably to the costs. Any trade-offs between costs and structural soundness that the Corps intends to make must be seriously examined.

A further problem, and potentially more serious one, is that there is no way of fully evaluating beforehand the effect reservoir loading will have on the active Susitna fault. This can only be done during the actual filling of the reservoir. If the impoundment of water at Watana and Devil's Canyon begins causing an increase in the frequency and intensity of earthquakes, the Corps will most certainly be compelled, in the interests of public safety, to stop the filling of the reservoirs.

Earthquakes could be induced even after the reservoirs are filled, particularly if there are large fluctuations in water level. Such fluctuations will occur at Susitna because during the peak energy demand months, the winter months, water flow into the reservoirs will be lowest.

The question that must be asked is whether the State of Alaska is prepared to take the almost inevitable seismic risk in order to secure electrical energy whose need has yet to be demonstrated.

Q. What other direct environmental problems are there with the SRDP?

A. Flooding of a large portion of the Susitna basin will destroy a large area of prime moose winter habitat.

Input from Terry R.

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Another problem associated with the dams is the increased flow of water into the lower Susitna River basin during the winter months. (The increased flow will be necessary to provide power during the winter.) This could result in massive overflow problems and the buildup of river ice that could inundate the areas adjacent to the river. This could destroy willow and brush along the river which moose are highly dependent upon during winter months. River ice could also cause damming later in the spring that could result in floods.

One further problem associated with the outflow from the dams is that the water will be essentially free of silt. Without a sediment load, the water will begin to erode the river channel. Furthermore, with the reduction of sediment transport from upstream, the lower Susitna wetlands and delta may not be replenished and may begin to erode away. This is occurring at the Nile River Delta because of the Aswan dam.

Q. With the environmental risks so high, do we really need the dams, especially since it appears they will be supplying much more power than we need?

A. It is not at all clear that we really do need the SRDP. Eric Gould (the Executive Director of the APA) and the Alaska Power Authority have justified the project in the past on claims that the railbelt electrical energy needs will increase drastically in the coming years. Supposedly by 1995, this demand will be four to ten times the present level. Such forecasts are based on projections made by the APA itself! Neither the basis for these projections nor reports explaining the projections have as yet been made available to the general public.

We did investigate one reference cited by Gould to confirm APA's predictions. This was a report issued by ISER. Reading through the article we were perplexed to find that a so-called "no-growth" projection resulted in a quadrupled demand for electrical energy by 1995! Upon close examination of the article we were astonished to find that what no-growth meant to ISER was this: an annual population increase in the railbelt area in excess of 4.5% per year, more than four times the national average. This would result in more than doubling the present population by 1995. Apparently what "no-growth" referred to was that, in this projection, per-capita consumption of electrical energy would remain static at mid-1970's level. The industrial sector, however (which was projected to grow as rapidly as the population), was projected to increase their electrical energy consumption by 5.8% per year, resulting in a tripling of per-capita usage by 1995! This is inspite of the most recent trend of decreased per-capita energy usage in Alaskan industry.

Such growth in population and energy use would be considered accelerated growth anywhere else in the world, but in this ISER report it is considered to be the lowest economic development projection. Apparently ISER must be contemplating the movement of some highly energy intensive industry to account for the drastic per-capita increases.

No consideration appears to have been given to the impact which doubling the population in less than 20 years will have on land use in the railbelt area and the large increase in hunting pressure in the surrounding region and throughout the State.

Q. Well, if we don't really need all this energy, for whom is it intended?

A. That's a good question and we're not sure what the answer is. Despite Eric Gould's and the APA's claims otherwise, their projections do imply large-scale energy-intensive industrial growth. What other potential users can there be? A recent report put out by the Department of Commerce and Economic Development states this quite clearly (Jobs and Power for Alaskans, July 1978, pp. 85-86):

> "Hydro projects are characteristically extremely expensive to install and require considerable sums of money to be spent before feasibility and refined total cost can be determined...
>
> "(For) large hydro projects, the increased use of electricity or the encouragement of energy intensive industry may be necessary to utilize excess energy in a project which might not otherwise be economically feasible to construct."

Q. What about the economic feasibility of the project?

A. With what is already known, economic feasibility looks grim. Even using the Army Corps of Engineers' very conservative construction estimates of $2.6 billion and the APA's inflated energy projections, the project has been judged only marginally feasible.

Bear in mind that the costs on the Trans-Alaska Pipeline skyrocketed from $900 million to $8 billion, a 900% increase. A similar cost overun on the Susitna project would bring the final tab to $23.4 billion.

There also are additional hidden costs that have not yet been brought up or discussed by the Corps or APA. For example, the SRDP is going to be a highly centralized source of electrical energy. The major metro areas, Fairbanks and Anchorage, and communities along the railbelt cannot and will not rely solely on this source; otherwise they would become vulnerable to any malfunction at the dam sites or along the power links. Back-up electrical generation systems will have to be built and maintained.

Such costs have not yet been factored into overall cost-effectiveness and neither have the additional costs of engineering the dams against large earthquakes. There are also many who feel that the costs of environmental damage and potential hazards should also be factored into the equation.

Q. Who is going to pay for the feasibility study?

A. It looks like the State will unless some legislation currently under consideration is stopped or amended. Right now the APA and the Governor's office is asking for a direct appropriation of $8.2 million to begin the first part of the study. The entire study will cost at least $25 million with probable cost overruns. The APA and the Corps want the money now so they can start work before the spring thaw.

Despite Senator Gravel's assertations otherwise, Federal reimbursement for the study seems highly improbable. The current trend in Washington, D. C., is to reduce spending and to cut back in hydro projects. There is also strong feeling that Alaska has already received more than its share of Federal subsidies. Furthermore, Senator Gravel has not endeared himself with the current administration nor with some key congressmen whose influence is necessary for consideration of the funding, particularly the head of the Water Resources Committee in the House of Representatives.

Even if the Feds do come up with the money, the mechanism of the reimbursement remains vague. Supposedly if the Phase I study shows the dam is feasible, then the Feds are supposed to reimburse the State. But who judges feasibility? The State? The Feds? Furthermore, what are the criteria? Economic? Environmental? Geologic hazards?

Before any appropriation is approved by the State legislature, these points must be clarified.

At the very least, the appropriation bill should be ammended to define feasibility and the mechanism of pay-back.

Q. Who will pay for the construction of the dams, if the State decides to proceed?

A. The Feds have already backed out of any full-scale funding for the SRDP. This is primarily because they see no reason for paying so much to build dams that will benefit so relatively few people. Because the Feds will not fund the project, Senator Gravel and others in the State have begun agitating for State financing of the dams through APA-issued bonds. Because of the risks involved in the dams and the probable cost overruns, the State will have to secure the bonds. The only source for such security is the Permanent Fund. There has also been some suggestion of direct financing of the SRDP using the Permanent Fund. The Fund is already being eyed to help finance the gas pipeline, and petrochemical industry. If the Susitna project is added to this list, we can only let out an exasperated cry of "What next?".

Note - The answers to the following two questions are still in the idea stage and we would really value your input on them.

Q. What should be done about the SROP bill, currently before the legislature?

A. Amend or change the bill to:

1. Establish a citizen's Review board to oversee the assessments of future power needs and energy alternatives.
2. Hire an independent agency such as Resources for the Future to ~~conduct~~ perform some of the studies
3. Broaden scope of study to include include unbiased investigation of all alternatives
4. Because of the intimate connection between APA and Army Corps of Engineers (Eric Gould, the executive director of APA was the chief hydrologist with the corp and has been a staunch proponent of Dividing over since its inception) other agencies should be hired to perform the studies. They will probably be cheaper.
5. Include provisions for open hearings on all aspects.

6. Define the mechanism of judging feasibility
7. Clarify federal re- involvement.

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round

Q. What are the energy alternatives?
A. (we really need help on this question most of all)

1. Small scale hydro?
   The corps has identified at least 40 rivers with potential for hydro-power along the mid-belt. They have never made their report available to the public.
2. Energy conservation
3. Solar, wind etc.
4. Fossil Fuels.

To really adequately answer the above questions we need an honest unbiased appraisal of Alaska's future electrical and other energy needs will be.

Questions:

get figures behind power projections

What is existing usage?

Effects on caribou herds in Malchina Basin
Moose herds

23% of annual harvest?

Value of Susitna salmon harvest
effects on fish?
from commercial fisheries

Hone in on economic feasibility figures

Gravel's study

2.1
2.7 - 2.5
2.8
2.23
Bradley Lake
4.4
4.6 - 4.24

Gravel
Wild & Scenic Rivers
4.27 - 4.32

Summary of House Resource Committee Hearing on Sustina Project (SJR 6 & SB 63)

March 5, 1979

1. Eric Yould, Alaska Power Authority

Yould gave a general explanation of the project's history, general finacing provisions and the timetable.

Cotten asked about the questions raised in Weeden's letter, specifically the demand projections xxxx:

Yould: even at an extreme low growth scenario of only .8% ijncreased consumption per year, the project would still be economically viable.

Cotten then asked about the appropriateness of the Corps doing the feasibility study.

Yould: revenue bond market--we have to sell our bonds to conservative, knowledgable investors on Wall st. They wouldn't buy the bonds if they didn't trust the Corps. (praise to wisdom of wall st, amen)

Yould escaped with no further questioning by the committee

2. Hugh Malone

Main question--what analysis of alternatives has been done? Who is making an evaluation of which project is best? Are we sure that this is the best deal? A range of varying costs--what are the nexxt best alternatives?

Would like to see the OMB study of 32 other sites. What is the impact of this projecton the Beluga coal field power plant proposal? Or on other large-scale alternatives such as using royalty gas via an in-state line?

Last year's legislature appropriated $300,000 for the study of alternatives (note--not exactly true), but the study funds were contigent on federal guarantees. ~~The commitment~~ Was made when the state's only commitment was to revenue bonds. I'm not saying that we shouldn't appropriate the eight million, only that we need to look at alternatives.

What are the erfects of the federal administration of the Corps contracts? The OMB wants additional information, befopre its approval.

Signoffs still have to be obtained from the local village corporations. We need to know which ones have ani interest in this land. D2 is a problem, the river has been selected as a proposed wild and scenic river--what are the erfects of that?

Even if the federal backing comes through, if the state decides not to go ahead with the project for our own reasons, we have to pay. and the ratepayers will have to bear the burden of cost overruns.

Agencies promote projects that they are interested in. We should get an independent analysis of the available alternatives; then decide what the magnitude of the state commitment should be. If the legislature provides funding, some sort of interim oversight committee should be set up, with the responsibility for renewing the Corps contract.

"I don't want the ratepayers on the hook." Alternative, incremental power plants may be more economical. Final shot--make sure Fish and Game has adequate money for biological studies.

3. Jim Brennen-as citizen and ~~Alaska~~ Alaska Center for the Env.

should delay funds for a year--~~M~~ OMB dissatisfactions, BLM permits, federal guarantees, possible alternatives are all questions that have not yet been resolved. stressed need to develop decentralized sourcews of power and inevitability of the development of the Beluga coal fields.

4. Roman Motyka--on own behalf, member of geophysical institute, evironmentalist

My concerns--cost overruns, as exemplified by pipeline. Seismic problems. Costs of backup systems. Limitations of bonding. Are demand forecasts backed up by assumptions of a capital move, energy-intensive industry moving into the state? What other options are available?

Eliasonasked the biological concerns, social impact, Zharoff concurred with Eliason's questions.

Carney--conservation groups should make some positive, specific suggestions, instead of always criticizing.

Chatterton attempted to trip Roman up by asking detailed questions about his seismic map and knowledge of the area.

Osterbeck--are you in favor of coal-fired plants, and coal-mining?

Eliason--are there any historical examples of a dam attracting industry?

5. Dick Logan, for F&G

Susitna supports the Cook Inlet fishery, of extremely high value. Dam also will affect upland habitats of moose, caribou and brown bear.

~~NEE~~ NEPA requires that ecological questions be addressed--EIS will cover questions, the feasibility studies have to be run to get the answers.

Have effect on caribou migration, possible thermal bloc to salmon spawning. Dams have caused big loss in fish populations, most impact will be downstream from dam. Hatcheries to replace have had varying success.

Osterbeck--what are impacts of alternatives? Logan--pipeline, coal plant would have much less effect than hydro project.

Eliason--what are the effects of flow levels, temperature changes?

Logan--we're able to manipulate the dam outflow to adjust temperatures, rate, can ~~possibl~~ increase fish populations, though increase in salmon is unlikely.

Halford--do you have enough money to do an adequate job? Logan--Yes; we proposed more, but understand it's a tight budget year (for Corps?) will accept what we get.

6. David Hutchins--exec. director of ass. of rural ~~electric~~ electric coops

strongly support ~~susin~~ susitna project. recent decrease in Fb power demand not representative of the rest of the Railbelt. Susitna is the best alternative for the region. Healy coal was shelved because of costs associated with the Clean Air Act. Small hydro projects are supplemental, not replacements.

Chatterton--would nuclear power be more cost-effective? Hutchins--don't know. Hutchins also stressed the federal prohibitions on using gas to generate electricity.

Zharoff--thanked everyone for electrifying testimony, keeping committee current on positive and negative aspects, generating discussion. numerous groans.

Box 349, Soldotna, Alaska
March 17, 1979

Susitna

Alaska Conservation Society
Box 80192 College Branch
Fairbanks, Alaska

Dear Members:

As a former member of the Alaska Conservation Society, Alaska Center for the Environment, Friends of the Earth (but not of Man), and the Sierra Club; I'd like to rebut your recent testimony against my pet project, the Susitna Hydropower Project. Generally speaking, I'd say this project's present single biggest problem is with you ultra conservationists, environmentalists, and preservationists -- who's obvious delaying tactic is to study the project to death with endless bad things that may happen, but not one good thing that will.

Your first teleconference statement to the House Resources Committee: We believe the State cannot afford to channel that money wholly thru agencies already committed in support of the project. O.K.- fine. Our State can easily afford to hire an independent, private agency to make an overall economic feasibility study of this project and other comparable alternatives, if you don't trust the objectivity of the Corps of Engineers. Meanwhile, why not let the Corps proceed with their 25 million dollar, 4 year engineering study to determine the project cost and environmental impact (an important part of economic feasibility), or don't you trust them with that either?

Your second statement: A.C.S. recognizes that energy needs will grow, that new energy sources will be needed, and pledge our support of an acceptable system for meeting those needs, and recognize that to oppose a poor choice is less than half of our full social responsibility. Noble words, indeed -- but you still haven't suggested one solid alternative comparable to the Susitna Project, and haven't said one good word for that. Is that facing our future energy needs with "full social responsibility"? And yet you question the Corps lack of objectivity.

Your third statement: We believe that effects of the Susitna Project on fisheries and wildlife have been underplayed to date -- evaluation of these aspects must be undertaken by competent people. Well, certainly, that's exactly what Corps of Engineers will do as part of their Environmental Impact Study with input from public hearings in the process. Of course, one thing is for damned sure: everything man does in this world is a trade-off, so any way we generate power is going to cause some environmental damage -- even retreating into candle-lit caves.

Your Problem No. 1: The need for such a large project has not been shown. Really now, is that bad? Don't you know that both dams do not have to be built and completed simultaneously, and that generators are commonly added to big dams as the need develops? What could be nicer than to start a large hydro-electric project with a decade or two of year-around employment -- and who's ultimate capacity far exceeds our foreseeable needs? Sure beats make-work public works projects or unemployment compensation, and seems much preferable to scrambling from one power shortage crisis to another -- doesn't it?

Your Problem No. 2: It's economic feasibility is, at best, marginal; at worst a terrible loss. Now that's a fine pre-judgement to make before the engineering & feasibility studies have even started. Right or wrong, you know who and what caused most of TAPS 900% cost overrun. And who can accurately predict the cost of anything 5-10 years ahead these days? On vital matters like harnessing energy, once a decision is made to do something, we must plunge ahead and complete it regardless of cost overruns (like TAPS). And of course there are are risks involved, but that's the price of progress.

Your Problem No. 3: The project risks massive flooding from earthquake damage. Maybe; but do you really have such little faith in the Corps of Engineer's ability and judgement to think they would advocate building a large dam where it is likely to fail? Come on now, be realistic.

Your Problem No. 4: A caribou herd of 20,000 animals will be threatened. That positive assertion is followed by 5 "could" possibilities. Well, maybe the caribou will be adversely effected and that's a price we will have to pay — no one will know until afterward. But if you're really so damned concerned about caribou mortality, why not thin out the wolves now?

Your Problem No. 5: More than 20% of the State's total moose harvest comes from the game unit surrounding the proposed Susitna Project. For it's size, the Susitna Project reservoir area will be small, since it is located in an unusually narrow valley (in extreme contrast to the Rampart proposal on the Yukon River). Of course, some moose habitat will be destroyed, but with moose populations rapidly declining all over the State from other causes, plenty should be left for the few survivors 10 years from now.

Your Problem No. 6: 38% of the Cook Inlet salmon harvest comes from Susitna. This resource could be threatened. In the first place, no salmon pass the first dam site at Devil's Canyon; the current is too swift. Furthermore, large dams reduce silty water downstream, not increase it as you say. And what percentage of the Susitna salmon run spawns in the mainstream and what in it's many large tributaries? In any case the dams could easily control the water flow during the brief spawning season to optimum water level, instead of "reduce the existence of and access to spawning sites" as you say.

Your Problem No. 7: The Susitna is not our only possibility for hydropower. Certainly not, but which of these 32 other hydropower sites in the railbelt area has Susitna's potential output, small reservoir area, central location, and convenient access from the Alaska Railroad? Come on, name one.

Your Problem No. 8: The State will probably be stuck with the bill — paying $2.6 billion or a lot more. Well now, what's wrong with that; shouldn't we pay our own way? If not, who should? And can you think of a better investment for the State's oil revenue (currently $940 million/year), or shall we dissipate more on the State bureaucracy (a favorite haven for many "conservationists"-right?)

Your Problem No. 9: The Corps should not do the feasibility study. Alright, "Since the Corps will be doing the planning, design and construction", let the State hire "an outside, independent, unbiased agency" to conduct the feasibility study. Of course, if the project proves to unfeasibile, there will then be no chance of study reembursement from Uncle Sam, as there otherwise is.

Your Problem No. 10: The study should be delayed. Well, that sums up your position nicely. Sure, that's the safest thing to do in the short-run, and hopefully we will all be dead before an energy crisis arrives. Or at worst, end up in candle-lit caves still pondering the problem after our oil and gas is gone, and it's too late to make the transition. The disadvantage of delaying the study is that time is of essence. Every year we wait will be one more year before the Susitna Project replaces our current nearly 100% dependence for power on extremely wasteful and low priority use of natural gas and oil. Isn't that urgent enough to get the show on the road as soon as possible?

Well, it is for me and others, so I say this time "damned the environmentalists and full speed ahead" with the Susitna Project, which appears so far to be our best hope for a large, perpetual, renewable, clean source of power with a minimum of environmental damage. Of course, it is very important for our State to make a firm committment now that this hydro-electric power will be used only to replace existing oil and gas power generation (which it will barely be capable of doing when completed 10-20 years from now), and not sold to induce new heavy industry into the railbelt area. That's the real joker in the deck now, which the gung-ho developers in Alaska would rather not discuss. And we have promoters like Senator Gravel talking about a domed city at Mt. McKinley with a monorail to Anchorage energized from the Susitna Project. That worries me some, too, but I don't see where we have much choice but to take that chance.

In closing I'd like to add that even Iran, with it's abundance of gas and oil, has had the good sense to invest heavily in hydro-electric power. Can we do less? This has been a hell-of-a-way to spend a St. Patrick's Day afternoon, but it will be worth the effort if it just stimulates your thinking about the consequences of endless study and delay. I still consider myself a conservationalist, but not your extreme breed that instinctively opposes any and all large developments.

Cheers,

Charlie Parker

C.C. to others

CHARLIE PARKER, R.L.S.
Land Surveyor & Map Sales
Box 349 Soldotna, Ak. 99669
Phone 262-4580

Alaska Conservation Society

Incorporated in 1960

Box 80192 College, Alaska 99701

April 10, 1979

Also sent to Ross Adkins

The Honorable Bill Miles, Chairman
House Resources Committee
Pouch V
Juneau, AK 99811

Dear Chairman Miles:

In previous correspondence and in testimony before the House Resources Committee, the Alaska Conservation Society has outlined several problems our organization perceives regarding the proposed Susitna hydro-project. A more detailed analysis of some of these concerns accompanies this letter. We hope you will read about them and our recommendations.

Being fully informed about the problems with Susitna is especially important, now that the Alaska Power Authority is preparing to ask the legislature for a direct appropriation to conduct the feasibility study, a study which may eventually cost upwards of $40-50 million. Given the many questions which still surround the Susitna project, the scale of potential State involvement, and the problems with IRS concerning the bonding of the construction phase of the project, it seems logical to us that for wise State energy planning, a totally independent evaluation of the Susitna project, energy demand projections, and alternative energy sources be done before becoming mired politically and economically in the Susitna project.

If the legislature should decide to start the Susitna feasibility study, then we strongly advise that only a minimum budget be funded and that the studies be limited to biological and environmental aspects. Such studies can be conducted by in-State agencies without involvement of the Army Corps of Engineers. The cost of such studies would probably not exceed $1.5 million. A better understanding of the biological and environmental risks of the Susitna project together with both an independent evaluation of economics and feasibility of Susitna and a study of the State's energy alternatives would provide the State with a solid base of information upon which future energy policy decisions can be made.

We wish also to once again emphasize that the Alaska Power Authority is not a planning agency; it is an implementing agency, one with strong ties to the Army Corps of Engineers and to the Susitna project. We question the propriety of using this agency to provide an objective,

unbiased appraisal of Susitna feasibility and alternatives. The State should be very cautious about channelling funds for further studies of Susitna through agencies which may already be committed to supporting the project.

Sincerely,

Marylee Crothers

for Ed Murphy, President
Alaska Conservation Society

EM/fp

Enclosure

April, 1979

Concerns About the Susitna Hydro-Project

1. The projected energy demand used by the Army Corps of Engineers is totally unrealistic.

The need for the large amounts of electric power that will be provided by the Susitna River Dams Project has not been demonstrated. Total residential industrial electrical energy consumption in the railbelt area was about 1.9 billion kilowatt hours (KWH) in 1977. The two Susitna dams will produce 6.9 billion KWH, over 3-1/2 times the amount of energy needed to meet 1977 consumption. The Army Corps of Engineers has continued to use the highly inflated and unrealistic growth projections made by the Alaska Power Administration (APA) to justify the Susitna project. Public involvement in APA's (a federal bureaucracy) projections has been conspicuously lacking, and APA has commonly manipulated statistics to suit their needs and bolster their arguments for excessively large future energy demands. For example, when APA has projected energy demands for the Alaska railbelt (i.e., the Anchorage-Fairbanks area), they have included the energy needs of the Kenai Peninsula and of the military. In fact, the power needs of the Kenai Peninsula will primarily be met by the Bradly Lake hydro-project. The military in Alaska has always generated its own power in the past and very probably would not use a centralized, highly vulnerable energy source such as Susitna, in the future.

The APA's projected growth patterns include a doubling to tripling of railbelt population in less than 20 years and a continued annual increase in per capita energy consumption of 3% or more per year. These projections result in energy demands of four to ten times present needs by 1995. The most recent trends in population growth and energy conservation in Alaska make such projections totally unrealistic. In fact, statistics from Golden Valley Electric Association (GVEA), the major commercial utility in the Fairbanks region, show that their per customer energy consumption is declining in Fairbanks. During the past three-year period, GVEA residential and commercial/industrial per customer usage has declined at average rates of 12.5%/year and 5.5%/year, respectively. Statistics from Anchorage utilities and from APA show that the annual increases in per customer usage have tapered significantly in the Anchorage area over the past three years. Total energy consumption in the Fairbanks area actually declined in 1978. Present energy consumption in Fairbanks is running considerably below what had been projected for this community in the Corps of Engineers' initial feasibility study.

The Corps of Engineers has overestimated future power needs before. This occurred when justifying the construction of the Snettisham dam near Juneau. The dam was built by the Army Corps of Engineers and is administered by the Alaska Power Administration. Although brought on line in 1973, the Juneau Power Utility is buying only one-fifth of the total capacity of the project. Consequently, the cost of power to the utility company is over twice the rate the Corps originally anticipated. Because of the slow growth in load, in order to cover the interest rates on the bonds that funded this project, it is expected that the price will again be increased in 1985 by 75 to 80 percent. With a much bigger project such as the Susitna, such a mistake would be a financial disaster.

No matter what the increase or decrease in energy consumption will be, the Susitna Project will not come on until the turn of the century. Utility companies will be required to build new power plants to meet the needs before the Susitna could come on line. Susitna power then represents an enormous glut of energy. In order to make the project economically feasible, the Corps will have to find a way to sell the excess power. Their proposed solution is rapid industrialization and the introduction of some highly energy intensive industries to the railbelt. Some of their proposals are a bauxite processing plant, a uranium enrichment plant, mineral processing plants, coal gasification plants, liquid natural gas plants, oil refineries, etc. Not only is this highly speculative (coal gasification plants are not yet a reality), but such industrialization is totally incompatible with the expressed opinions of the majority of Alaskans who do not desire rapid large-scale industrial growth. The Susitna project, in fact, represents a de facto imposition of an accelerated growth plan upon Alaska which is totally contrary to Alaska's desire for planned growth and control over their future. No consideration appears to have been given to the impact which doubling and tripling the population in less than 20 years will have on land use in the railbelt area and the large increase in hunting pressure in the surrounding region and throughout the State, nor to the environmental impact of such large industrialization to the railbelt area.

2. The economic feasibility of the Susitna project is highly questionable.

Even when using the Corps' very conservative cost estimate of $2.6 billion, economic feasibility has been judged as marginal. The Susitna project would involve two dams, each one larger than the Hoover Dam. The project would be the biggest and most expensive ever attempted by the Corps. It would also be the first large-scale hydro-project ever attempted by the Corps in a subarctic region, an environment notorious for its engineering difficulties. Compounding the engineering problems is the fact that the dam sites will be located in a highly active seismic region. Dealing with such problems can easily lead to significant cost overruns on the project.

The Office of Management and Budget (OMB) has shown that if the Susitna project has a cost overrun of as low as 30%, the benefitcost ratio would be less than unity, making the project economically unfeasible. The Snettisham Dam in Juneau, Alaska, had a cost overrun of 36%, over and above inflation, and it was a much smaller project. A study made for the U.S. Senate showed that large custom engineering projects, such as Susitna, have cost overruns, over and above inflationary costs, of between 50 and 500%. In Alaska the best cost estimates for construction of the oil pipeline, based on all the final environmental stipulations, was $2.5 billion. The end costs were $9 billion, a cost overrun of 300%.

Several additional hidden costs have not yet been brought up or discussed by the Corps. For example, the Susitna project is going to be a highly centralized source of electrical energy. The major metro area,

Fairbanks and Anchorage, and communities along the railbelt cannot and will not rely solely on this source; otherwise they would become vulnerable to any malfunction at the dam sites or along the power links. In fact, the utilities are required by Federal law to have reserve power on hand equal to the largest generating plant on the line. Such backup electrical generation systems will have to be built and maintained, and will add significantly to the overall costs of the project.

Such costs have not yet been factored into overall cost-effectiveness and neither have the additional costs of engineering the dams against large earthquakes and a subarctic environment. There are also many of us who feel that the costs of environmental damage and potential hazards should be factored into the equation. For example, almost 40% of Cook Inlet's salmon harvest comes from the Susitna River. This is more than a $15 million per year industry, almost 5% of the yearly benefits of the dam project at peak production. Recent research by the Alaska Department of Fish and Game has indicated that severe impacts to the fishery may occur with the construction of the dams.

OMB has raised several other important questions regarding the feasibility of the Susitna project. The Corps has yet to adequately answer these questions. OMB's comments have been appended to the testimony and deserve serious consideration.

We as Alaskans are deeply concerned about who will have to pay the inevitable cost overruns associated with a project of such massive scale. If the Federal Government does not foot the bill of cost overruns, then the burden must inevitably fall onto the Alaskan railbelt electrical utility rate payers, and with the strong possibility of State Government involvement, onto all Alaskan taxpayers.

3. The potential seismic risks are significant.

The seismic hazards come from two factors. The first is that the two huge dams and their associated reservoirs will be located in an area that is well-recognized for its high degree of seismic activity. The second is that the reservoirs themselves can induce seismic activity.

Much of the present seismic activity in the region appears to be connected to the well-known Denali fault system. This fault lies between 40 to 50 miles from the proposed dam sites and follows an arcuate path to the north and west of the Susitna basin (see accompanying map).

Of greater concern is the recently recognized Susitna fault, an active fault which crosses the Susitna River immediately west (less than 5 miles) of the proposed site for the Watana dam. At least 5 moderate earthquakes (and many smaller ones) have occurred on or near this fault within the past six years. The fault extends from the Susitna Glacier in the Delta Range to the south of the Talkeetna River, a distance of over 60 miles. This region is a zone of crustal weakness and the fault is thought to be acting as a splay off the Denali fault system.

Compounding the problem of the natural seismicity in the area will be the loading caused by the impoundment of water behind the dams. It is a well-known fact that reservoirs commonly induce seismicity. Rather

severe earthquakes, up to magnitude 6.4, have accompanied the filling of reserves at a number of dams around the world including places which had previously been aseismic. In one case, a reservoir-induced earthquake at Konya Dam in India caused severe property damage and the loss of 200 lives.

The Susitna dams and their reservoirs will lie on opposite sides of the active Susitna fault with the upper part of the Devil's Canyon reservoir actually overlying a portion of the fault. The high loading and water from these reservoirs could very possibly trigger strain energy which had been stored in the rocks prior to impoundment could result in a massive earthquake whose epicentral region is likely to lie within the immediate vicinity of the Susitna dams.

The following is a quote from J. P. Rothe's "Fill a Lake, Start an Earthquake," New Scientist, 39, 75-78, 1968:

> "It is by now clear that one can cite specific cases where tremors, some of which are severe enough to produce extensive damage, are caused by the construction of dams. When he builds these, Man plays the role of the Sorcerer's Apprentice: in trying to control the energy of rivers, he brings about stresses whose energy can be suddenly and disastrously released."

Wendell V. Mickey, who was Chief of the Seismology Division of NOAA, recommended that "no dam should be built within the disturbed zone of an active fault."

If a huge earthquake causes physical damage to either dam, the potential exists for massive floods to sweep down the lower Susitna River. Such floods could swamp the Parks Highway and the Alaska Railroad and devastate the communities along this transportation corridor--Gold Creek, Talkeetna and others. Even if direct physical damage does not occur to the dams, earthquake-generated ground motions and landslides into the reservoir could generate tsunami-like waves that could overtop the dams and result in flooding down the river. The earthquake itself could also cause direct damage to communities near the epicenter.

The Corps claims they have upgraded their design so that the dams will withstand an 8.5 magnitude earthquake whose epicenter is 40 miles away and is at a depth of 20 miles. More recently the Corps has finally recognized the severe seismic hazard in the immediate vicinity of the proposed dam sites. Much of their proposed Phase I feasibility study centers around exploring this problem.

It's debatable whether the Corps can really design the dam structures to withstand the severe ground accelerations near the epicenter of a large earthquake and still preserve the overall cost effectiveness of the project. The more massive the structure, the more likely it will be able to withstand an earthquake, but size can add considerably to the costs.

A further problem, and potentially more serious one, is that there is no way to fully evaluate beforehand the effect that reservoir loading will have on the active Susitna fault. This can only be done during the actual filling of the reservoir. If the impoundment of water at Watana and Devil's Canyon begins causing an increase in the frequency and intensity of earthquakes, the Corps will most certainly be compelled, in the interests of public safety, to stop the filling of the reservoirs.

Earthquakes could be induced even after the reservoirs are filled, particularly if there are large fluctuations in water level. Such fluctuations will occur yearly at Susitna because, during the peak energy demand months, the winter months, water flow into the reservoirs will be lowest.

Most Alaskans are not prepared to take the almost inevitable seismic risk in order to secure electrical energy whose need has yet to be demonstrated.

4. The Susitna project poses a significant threat to the region's fisheries and wildlife.

We believe that the effects of the Susitna project on fisheries and wildlife have been severely underplayed by the Corps. Our brief talks with biologists have alerted us to the probability that the project could drastically reduce the Susitna River's salmon producton, seriously reduce Nelchina Basin moose and caribou stocks, and as a result, decrease recreational opportunity while simultaneously increasing local recreation pressures on remaining wildlife. A full and careful evaluation of these aspects must be undertaken by competent people before getting into the Susitna dam project.

More than 20% of the State's total moose harvest comes from the game unit surrounding the proposed Susitna project. The Alaska Department of Fish and Game considers the Nelchina Basin within which the Susitna project will be located, one of the most important game areas in the State, providing large numbers of game animals and roadside access for hunters and viewers. A very significant part of fall and winter moose habitat used by moose in this unit would be covered by the impoundments. This could mean a considerable reduction in moose numbers which would limit hunting and viewing opportunities.

The calving grounds for the Nelchina caribou herd (20,000 animals) are near the proposed impoundment sites. Movement of animals to and from the calving ground could be impeded by the reservoirs. Considerable mortality to the herd could result during the crossings. More likely, as with reindeer in Norway, they may cease migrating. The ensuing limitation of range can be expected to cause a drastic plunge in their population. Most non-migrating herds number in the hundreds. The feasibility study itself could adversely affect the caribou herd. The study would build a road to the dam sites, creating access for many people. Ensuing trails could lead people directly into the calving grounds. In 1978 close to 3,000 people applied for permits to hunt the Nelchina caribou herd.

Adjacent to these lands, in McKinley Park, the McKinley caribou herd has deteriorated badly. It is questionable whether it will ever recover. The Nelchina caribou herd of 20,000 animals is really the only other herd of account in the Interior. With the pipeline already affecting the Western Arctic herd and the threat of oil and gas development in the Arctic National Wildlife Range that could disastrously affect the Porcupine herd, we may find in the future that the Nelchina herd is of national significance.

Thirty-eight percent of the Cook Inlet salmon harvest comes from the Susitna. The Susitna River is the highest producing river into Cook Inlet of all salmon species, save the sockeye. It is the second or third highest producer of sockeye salmon. In the winter the Susitna runs clear, and thus it is satisfactory for the rearing of juvenile salmon which move into it at that time. The dam would probably cause the winter waters to run silty and, thus, would be unsatisfactory for that purpose. This condition would affect the entire length of the river down to the mouth. Also, the probable decrease in water level downstream from the dam to the mouth during summer would reduce the existence of and access to spawning sites.

5. An adequate analysis of Alaska's choices of alternate energy paths has not yet been made.

To construct and become dependent upon a single, centralized energy source is contrary to what we consider to be good energy planning for Alaska. Rather, we feel that energy sources should be decentralized and varied. Several alternatives are available for Alaska and need to be investigated in greater detail before becoming locked into a Susitna project. At least 32 alternate smaller-scale hydro-power sites have been identified in the Alaskan railbelt area. Indepth studies of these potential hydro-sites is conspicuously lacking. To our knowledge, only cursory studies have been made and these were done during the late 1940's. Smaller-scale hydro holds a distinct advantage over Susitna. Such projects could come on line much sooner and could be incremented in to meet energy demands as they occur. We feel that a thorough evaluation of this alternative hydro-power path is needed before proceeding with Susitna.

Proper insulation of homes and businesses and other conservation measures can lead to tremendous savings of energy. Further, although many people find it hard to believe, solar power in Alaska is becoming increasingly practical. New homes are being designed to take advantage of passive solar heating and solar heated water tanks in the Fairbanks area have been shown to be competitive with electrically heated water tanks. Because they are labor intensive, such conservation alternatives can significantly increase local employment. Furthermore, purchase of construction materials for such improvements would greatly benefit local business and add to the diversification of local economies.

Another alternative which has not yet been fully explored, is the potential of direct use of natural gas for home heating, water heating,

and cooking in Alaska. Such direct use of natural gas has been shown to be twice as efficient as using gas-generated electricity for these same purposes. Studies have shown increased use of natural gas for home space heating in the Anchorage area. This trend is expected to continue into the foreseeable future.

The New Carter Water Policy requires that the federal agency considering a dam must prepare a nonstructural or demand reducing alternative. No effort has been made by any agency to do this.

Summary

We feel that the Army Corps of Engineers, the Alaska Power Administration and the Alaska Power Authority (a state agency) are overstepping the bounds of their authority in their attempts to circumvent the State's planning process, by trying to impose an energy policy onto the State. We further feel that the seriousness of the problems regarding economic feasibility, financing, geologic hazards, and environmental risks warrant delay of any action on the Susitna project until:

1. An independent evaluation of the Corps' projected construction costs, economic feasibility, financing and geologic-environmental risks can be made.

2. Alaska's energy alternatives and choices of paths for growth and development are fully examined.

3. The Alaskan citizenry has been made fully aware of the implications of Susitna power and of what alternate choices are available.

4. The public is allowed to participate in choosing the direction in which the State is to proceed.

QUESTIONS ON THE ECONOMIC FEASIBILITY OF THE SUSITNA PROJECT, ALASKA PUT FORTH BY THE OFFICE OF MANAGEMENT AND BUDGET

There are a number of areas where additional information on the Susitna Project is needed to provide an adequate basis for assessing its engineering and economic feasibility. These areas are as follows:

1. Watana site geology and test borings

   The cost estimates for Watana have been derived without benefit of any test borings at the Watana Site. This is a departure from standard Corps practice, which calls for exploratory drilling at all sites before projects are proposed for authorization. Test borings would provide more reliable data on which to base cost estimates and on which to assess any potential seismic problems. The Watana Site is located near the Susitna fault and also within 50 miles of the Denali fault--an area where major earthquakes have occurred in the past.

2. Contingency estimates

   A standard 20% contingency factor was used in arriving at cost estimates. A contingency of 30% could result in reducing the benefit cost ratio to 1. A larger contingency factor could reduce the ratio below unity. The recently completed Snettisham project in Alaska cost 36% more than original estimates, after correction for inflation.

   A review of the 20% contingency factor should be undertaken in light of the best existing information on comparable projects and project locations.

3. Area redevelopment benefits

   These benefits are a correction for the use of otherwise unemployed labor during construction. Though standard procedures permit this benefit category for power projects, it would seem that such benefits should not be accepted in the Susitna Report because provate development for power purposes would produce equivalent benefits.

   An evaluation of the validity of the use of ARA benefits in the Susitna Report should be made.

4. Construction schedule

   The 11-year construction schedule for the Watana project, based on preliminary inspection of comparable projects, appears to be on the short side. A longer schedule of 14 years appears more reasonable because of (1) normal slippages and (2) a three-year peak construction wchedule that calls for more work to be put in place on a single site than the Corps has ever accomplished in similar time periods. This should be reexamined and its effects on the project B/C ratio calculated.

5. Supply estimates

The analysis of the without project condition needs to be expanded considerably to clearly analyze the following:

1. Why, with natural gas projected to be in such short supply, the Anchorage utilities have only contracted for 55% of proved reserves or 25% of estimated ultimate reserves.

2. The sensitivity of the analysis to the collapse of OPEC and the cost of shipping oil to the East Coast.

3. The necessity for an Anchorage-Fairbanks intertie at a cost of $200-300 M.

4. Scheduling of powerplants and the reduced risk of building small increments.

6. Demand estimates

The analysis of load growth should be more specific with respect to:

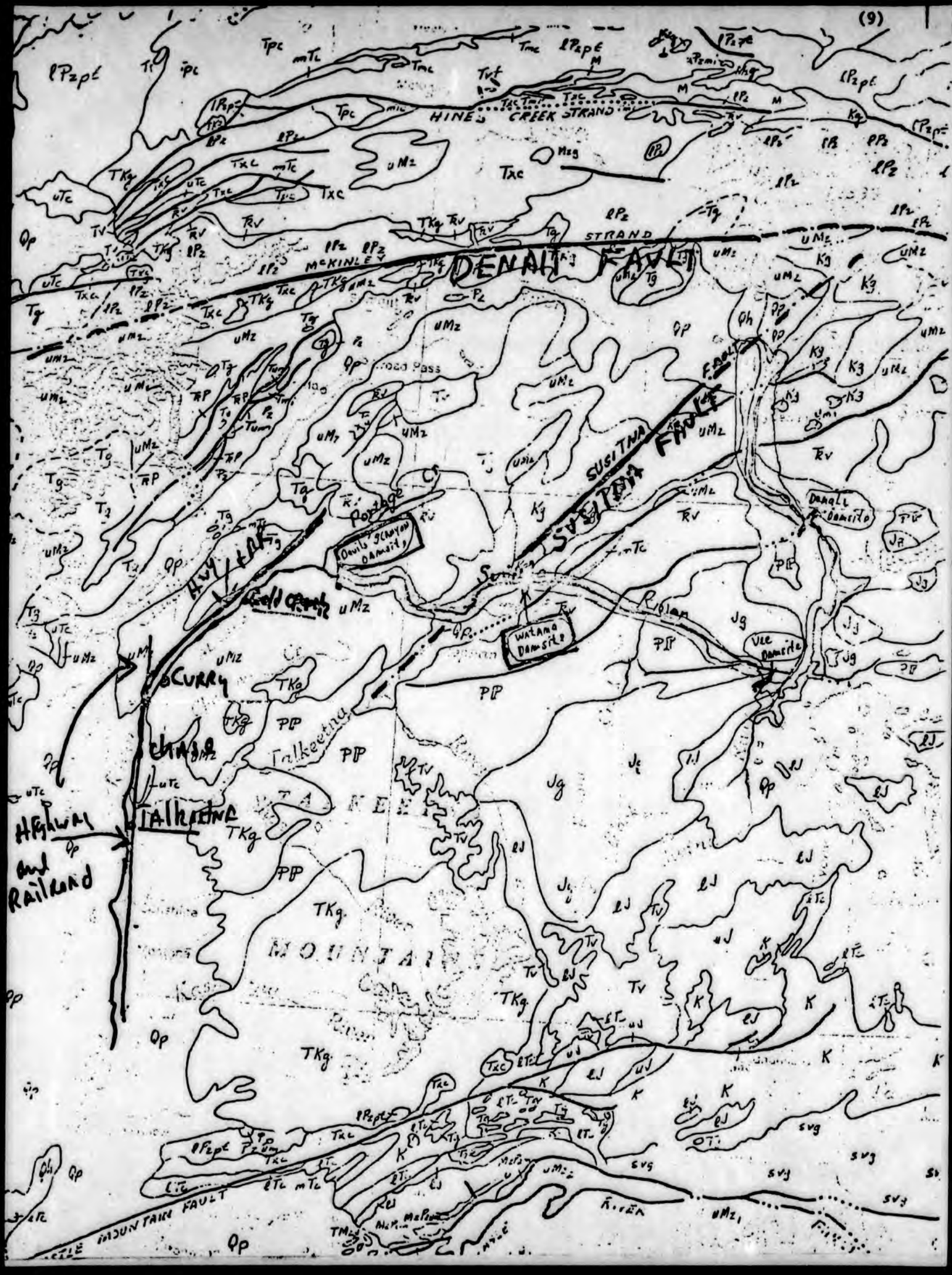
1. Increasing use by consumers; and,

2. Increasing number of consumers.

3. Industrial growth, i.e., where does Alaska's comparative advantage lie outside the area of raw materials and government functions?

7. Sensitivity analysis

Power demand should be subjected to a sensitivity analysis to better assess the uncertainties in development of such a large block of power. The typical utility invests on the basis of an 8-10 year time horizon. The Susitna plan has an 11-16 year horizon in face of risks that loads may not develop and the option of wheeling power to other markets is not available. It should be noted that the power demand for Snettisham was unduly optimistic when it was built. This resulted in delays in installing generators. A similar error in a project the size of Susitna would be much more costly and would have a major adverse effect on the project's economics.


HINES CREEK STRAND
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McKINLEY STRAND
SUSITNA FAULT
Devils Canyon Damsite
Watana Damsite
Vee Damsite
Denali Damsite
Portage
Gold Creek
Talkeetna
Talkeetna
Highway and Railroad
Curry
Chase
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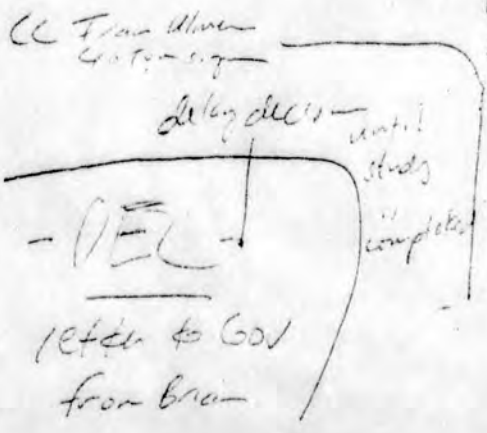
8/22/79

Brian,

This was part of a draft state response to the Corps on their final EIS on Susitna. That's another story, but I thought the comments by Dave Sturdevant* of DEC would interest you in your efforts on the new study. Let's keep in touch.

Yours,
Tom Sunger



[send for outline]

Dave Sturdevant
465-2663

Response of the Alaska Department of Environmental Conservation to the Upper Susitna River Basin Hydroelectric Power Development Final Environmental Impact Statement:

Thank you for the opportunity to review the FEIS for the Upper Susitna River Basin Hydroelectric Development (January 1977).

In reviewing the FEIS, we find that many of the concerns expressed by this Department in our comments (attached) on the DEIS have not yet been answered to our satisfaction. For example, in our comments on the DEIS, we addressed the problem of excess capacity as a spur to uncontrolled growth. In the FEIS, the contention that the project will not have any significant effect on growth (p 65) is based on population and demand projections. These projections are of questionable accuracy and currency. In the Fairbanks North Star Borough's "Energy Use Inventory" the conclusion is drawn (p. 69) that even APA's demand and population projections are unwarrentedly high. For this reason, APA has updated its projections. The new projections, positing significantly lower population-demand rates, are not used in the FEIS. Testing projections against actual demand, ISER's forecast indicates rates closer to a limited growth model identified in earlier projections.

The APA demand projections are based on estimated annual population growth and per capita energy growth. The respective figures used in the median projection are roughly .034 and .0275; high, .051 and .0375; and low, .027 and .0175.

Historical growth rates are indicated below:

	70-73	73-77
Energy per capita:		
Fairbanks	10.5	10.6
Anchorage	14.2	12.7
Population statewide	3.0%	5.6%

The significance of the above observations lies not only in the potential for excess capacity that would act as a spur to growth, but also in the validity of the assessment of alternatives. Several single dam projects are eliminated from consideration in the FEIS' alternatives as producing

DEIS - 6/76

ACE survey on alternative energy

D.S. has # of problems with demand projections of AkPAdm. are lower than most

populations projections are also too high

eg Matz report for Fb

too limited a supply of electricity to meet demand. Readjustment of the demand projection may lead to re-evaluation of the alternatives. We further question the FEIS' assumption that power could be on line by 1986, as APA indicates on-line power in 1994. Alternatives are assessed in terms of the 1986 projection. Reassessment of the alternatives considered should deal more with likely mixes of energy sources than with "either/or" arrangements. The alternatives discussion is superficial:

a) No cost figures are included;

b) The natural gas supply is not examined, nor are Chugach Electric's plans to continue with gas;

c) We disagree that "Nuclear power should be considered a likely long-range source of baseload power;"

d) The solar alternative ignores non-electric solar potential;

e) The potential for displacement of current electric uses through conservation should be examined, as should increased efficiency, and alternate renewable fuels. Electricity "saved" can then be applied elsewhere. This process is accepted by many utilities "outside" as the cheapest and quickest source of new power.

Regarding the section, "Environmental Impacts of the Proposed Action", we find our DEIS comments still valid. Additionally, although many adverse or potentially adverse impacts are identified, consideration of mitigating measures is not in evidence.

Any dam complex will even out the annual flow cycle, reducing summer flow and increasing winter flow. At the same time winter turbidity will be increased from near zero to an estimated 15-35 ppm, according to the FES. It appears this would constitute a violation of a Water Quality Standards, and would have to be resolved.

Witton

The Politics of Hydroelectric Power in Alaska: Rampart and Devil Canyon--A Case Study

Completion Report
OWRT Agreement No. 14-34-0001-7003
Project No. A-060-ALAS

Claus-M. Naske
and
William R. Hunt

Institute of Water Resources
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Fairbanks, Alaska 99701

The work upon which this completion report is based was supported by funds provided by the U. S. Department of the Interior, Office of Water Research and Technology as authorized under the Water Resources Research Act of 1964, Public Law 88-379, as amended.

IWR-87

January 1978

RAMPART DAM

In 1959 Congress appropriated money for an initial Corps of Engineers' study of the feasibility of Rampart Dam. Subsequently more money was made available and, over the next few years, the Rampart project occasioned a controversy whose size matched that of the proposed facility. The controversy exposed the problems associated with the construction of such vast public power projects; it revealed the concerns of opposing interested agencies and opinion groups; and, above all, it highlighted the time lag affecting such projects.

It is not the purpose of this study to show that Rampart was either a sound scheme, unfortunately aborted, or a foolish one, justly suspended. We wish, rather, to show the complexity of public response, and the relationship of the Rampart project to the planning of Devil Canyon.

The investigation of the feasibility of a hydroelectric facility at Rampart Canyon on the Yukon River originated with a resolution of the Senate Public Works Committee dated April 24, 1959. This memorandum requested that the Board of Engineers for Rivers and Harbors of the U. S. Army Corps of Engineers investigate and report on the project. A small sum, $49,000, was appropriated for the study.

Rampart Canyon, a narrow portion of the Yukon River near the town of Rampart about 100 miles northwest of Fairbanks, offered impressive possibilities for hydroelectric development. The corps's study indicated that the site could hold the largest dam in the world, one which would be backed by a reservoir larger than Lake Erie produced by the flooding of 10,000 square miles. Such a project's electrical power output would be commensurate with its physical proportions: five million kilowatts of power could be generated each year, fully two and one-half times as much as Grand Coulee Dam and twice that of any other dam in existence. These awesome statistics had been gathered prior to Congress's resolution of April 1959, so it was clear that the scope of the potential development was generally understood.

Sponsors of Rampart in the U. S. Senate predicted that the economic benefits of Rampart would be very great. At that time Alaska was not yet officially represented in the Senate and Rampart's proponents included

Richard L. Neuberger, an Oregon Democrat who had an abiding interest in Alaskan matters. As the corps prepared to investigate Rampart, Neuberger told Oregonians and others in September 1959 that Rampart was one example of a means by which the new state of Alaska could contribute to Pacific Northwestern prosperity. "Rampart dam on the Yukon River alone," Neuberger told realty board members from five Pacific Northwest states, "could support an aluminum industry which would dwarf even that in our own states of Oregon and Washington. Much of this economic progress is bound to spill over into the states which are Alaska's neighbors."(1)

The Corps Promotes Rampart

In October 1959, Governor William A. Egan of Alaska announced that work by the Corps of Engineers on a survey of the engineering and economic feasibility of Rampart had begun.(2) On the same date, a corps official, Harold L. Moats, chief of the civil works planning branch, described Rampart to the Anchorage Chamber of Commerce. Since the high cost of power was an endemic Alaskan problem, the chamber was cheered to hear that Rampart hydroelectric power could be produced for a mere two mills per kilowatt hour at the dam. Moats also explained that the experiences of Russians and Scandanavians indicated that Rampart power could be transmitted by ultra high voltage to Seward, Anchorage, and Valdez for only an additional mill per kilowatt hour. In fact, the Rampart area appeared to be the only place left in the United States where water power could be developed to electric power for less than four mills per kilowatt hour.

Moats suggested other benefits of the proposed 1.3 billion dollar project as well. The 470-foot dam would probably raise the mean annual air temperature of the area one or two degrees, perhaps making the surrounding territory suitable for agriculture. According to the press, Moats assured his audience that Rampart "would be justified by the amount of industrial development that would take place in its wake." But he warned his listeners that "it will be many years before the first kilowatt can be wrung out of Rampart."(3)

Congress's initial appropriation of $49,000 for the Rampart study in 1960 was supplemented for 1961 by a further $225,000 to the Corps of Engineers. Early in 1961 the Alaskan congressional delegation announced

the appointment of an eight-member economic advisory board which would address itself to an economic study to be carried out by a private firm selected by the Corps of Engineers. Its members included W. T. Kegley, Governor Egan's representative; Dr. William R. Wood, President of the University of Alaska; Irene Ryan, Anchorage mining engineer; Stanley J. McCutcheon, Anchorage attorney; Frank H. Mapleton, Fairbanks mechanical engineer; Dr. Edward Steve Shaw, Stanford University economist; Samuel B. Morris, Los Angeles consulting engineer; and Gus Norwood, executive secretary of the Northwest Public Power Association. Corps plans for the 1961 winter included economic study, dam structure study, and reservoir investigation. It was also announced that the U. S. Fish and Wildlife Service, a unit of the Department of the Interior, would make an independent study of the effects on wildlife of such a project as Rampart.(4)

In April 1961, Harold L. Moats of the corps reported on progress to a meeting of Anchorage civil engineers. He stated that an "exhaustive economic study" by a private consulting firm which he did not name, would probably take two years to determine the project's economic feasibility. He also described the drilling, topographic, and hydrographic work which the corps was carrying on.(5)

Moats was cautiously optimistic about the project: "Rampart is so large that many people consider it as something that must be considered for the far-distant future. That is not necessarily so. Our studies show that with full authorization and proper allocation of construction funds it is physically possible that Rampart could start producing a substantial amount of power for industry by 1971-72." It would take about 20 years to fill the huge reservoir but "it also takes some time to develop an industrial complex that can utilize a block of power of about 5 million kilowatts." (6)

Moats recognized such problems as the effects of extreme cold on the project and of the dam on spawning fish and migrating game, but felt that such difficulties would be overcome.

In public presentations made by Moats and Colonel Christian Hanburger of the Corps during the winter and spring of 1961, the corps spokesman stressed the long-range view of power needs, while stating

that full economic studies must still be made. Alaskans responded gladly to prospects for future industrial developments suggested by the corps officials. It was cheering to hear that "even Rampart's total capacity will be insufficient for the future demands of power-hungry industries--industries which process metal ores through electrical processes and industries that are auxiliary to these." Such industries as these "must locate where the power is cheapest."(7)

It was not the corps's policy to refer directly to the power projects of other agencies, such as the Devil Canyon proposal of the Bureau of Reclamation; however, Hanburger did assure Alaskans that "there is not another project in the planning stages in Alaska which could be built and on the line in 10 years with this kind of low-cost power."(8) This was a valid reference to Devil Canyon, which was the only other possible rival to Rampart, and which was then being planned by a rival federal agency.

Bureau of Reclamation Competes

In 1959 the Bureau of Reclamation's report on the Devil Canyon project expressed favorable prospects for the Susitna River basin which was "ideal in many respects for initiating a substantial hydroelectric development program in the Railbelt of Alaska." Such power could be produced at a reasonable cost of five or six mills per kilowatt hour to the consumer. Another study released by the bureau early in 1961 was equally optimistic about the two dam projects which would include a 680,000 kilowatt capacity power plant, a capacity nearly eight times the current production of all power plants in Alaska. As Reclamation Commissioner Floyd Dominy put it in a Boston speech at a meeting of the Associated General Contractors, "This energy could be a major factor in unlocking Alaska's industrial development."(9)

Clearly the Bureau of Reclamation was reacting to the corps's push for the Rampart Dam project. Initially, the Bureau commissioner avoided specific references to the rival Corps of Engineers Rampart project, but the thrust of his remarks clearly formed an argument: Devil Canyon was big enough to meet anticipated power needs and foster industrial development.

It appeared that battle lines were being drawn between the two projects. There was nothing illegal or tawdry in the rival agencies' appeals to the public. In fact, it looked in 1961 as if interested parties would be given a choice of power alternatives which, in the democratic process, was certainly a healthy situation. Before long the power issue was sharpened in the public forum. In September 1960, Floyd E. Dominy, Commissioner of the Bureau of Reclamation told a Senate Interior and Insular Affairs Committee that Rampart was not needed and its consideration should be postponed indefinitely and that the Bureau of Reclamation offered a better answer to power needs. Dominy submitted his agency's feasibility report on the Susitna River, "a more modest program...to meet the Railbelt's needs for years to come." Devil Canyon and the other proposed Susitna projects "can keep ahead of growing requirements."(10)

The modest proposal of the Bureau did not go unnoticed by Rampart proponents. Senator E. L. Bartlett of Alaska charged Dominy with attempting to "dynamite" Rampart, a stance "in keeping with the 'do-nothing' policy of the Republican administration in western power development." Bartlett apparently believed that more was involved than the traditional Bureau of Reclamation-Corps of Engineers rivalry; Dominy's statement reflected a Republican election tactic to discredit the Rampart project. The "limited present market" argument, he stated, was a familiar echo of Republican sentiment, an argument used earlier "against Grand Coulee and the other great dams of the West."(11)

Bartlett insisted that Democrats were not supporting Rampart to the exclusion of other projects, like Devil Canyon: "We are strongly for the multi-stage development of the Susitna."(12) Obviously Bartlett knew well that Congress was not likely to fund Susitna projects in addition to Rampart, but did not find it necessary to explain that.

Looking back now to the 1960-61 period, it is possible to see that Alaska's power proponents led by Senator Ernest Gruening determined that one project should be presented to Congress, and that would be Rampart. It would not do to divert attention to Devil Canyon or any other alternative. Once this decision was made, only limited means of calling attention to Devil Canyon remained. Without backing from either Alaskan public officials or state newspapers, the Bureau of Reclamation had little chance to rally support for the Susitna project.

Market Study

It was May 1961 when the corps announced the granting of a $120,000 contract for the evaluation of Rampart's economic benefits. The Development and Resources Corporation of New York was selected "from among seven advisory corporations of international renown."[13] David E. Lilienthal, formerly chairman of the U. S. Atomic Energy Commission, was chairman of the board for the organization and its president, Gordon R. Clapp, had formerly chaired the board of the Tennessee Valley Authority. This respected organization had one year in which to conduct the study which would determine the size of the market for Rampart's power, basing its analysis on existing data and projections for the future.

According to the corps, the corporation would start with several major premises: that the U. S. population was expected to rise sharply as reported by the U. S. Department of Commerce; that the gross national product would increase to $570 billion by 1965 and $2,300 billion by 2010; that personal income would increase; that employment and business activity would continue on a high level such that the standard of living for the U. S. and the world would continue to grow; and, finally, that technology in the major power-using industries would develop along lines then generally recognized as feasible for the future.

Given such premises and the hydropower orientation of the organization's officials, the corps might have had reason to believe that the Development and Resources Corporation would not be dismayed by the potential of Rampart.

The corps was not indifferent to its public reputation. Fairly or not, opponents of that agency had frequently charged that its only concern was in building dams, regardless of particular needs and other considerations. Opponents of Rampart were already voicing this sentiment, and Colonel Christian Hanburger tried to remove any impression of over-eagerness in a series of public pronouncements in August 1961. Speaking to the Fairbanks Chamber of Commerce, Hanburger stressed that Rampart could not be built unless a market existed for the enormous amount of power which would be produced. Feasibility did not depend upon the suitable conditions for construction: "We must know that there will be a market for the power...it must be proven that what can be

produced can be used to benefit Alaska and the nation." And this crucial factor was to be determined by an assessment of an independent agency--not by the corps itself; this was why the corps had contracted, with much attendant publicity, with the Development and Resources Corporation. Hanburger admitted that neither present nor future power needs in Alaska justified a project of Rampart's capacity. There was a "dire need" for cheap power in Alaska, but "we cannot afford to go out and develop power to the extent that we will have a large block of it sitting around unsold."(14) What the corps needed was some assurance that Rampart's construction would trigger industrial growth, i.e., that users would establish plants in Alaska in order to use the cheap power.

Hanburger's cautious assessment did not deter such Rampart proponents as Alaska's Senator Ernest Gruening, who were not worried about excess power since they believed that a surplus of power could attract much-needed industry to Alaska. Their view followed a historic Alaskan pattern which had been expressed again and again in the past, namely, that if a resource or a transport means were first made available, swift development would follow inevitably. In this view, providing the resource first was not putting the cart before the horse; on the contrary, it was the rational pattern for prospective development. In fairness to their view of things, it was difficult to forecast what future power needs might develop. According to Hanburger's estimate, Rampart, if all studies proved favorable to construction, would not generate power before 1971 or 1972. Perhaps by that time, its proponents reasoned, industrial demands for power will have multiplied many times beyond current expectations. A matter of faith in Alaska's potential was involved.

Gruening's Leadership

Senator Ernest Gruening's great interest in Rampart became apparent in the spring of 1961. After a visit to the dam site by Army engineers and the advisory board, Gruening told the press "we're going to get Rampart." His expression was to be repeated often from that point and amounted to something of a war cry for the project. The dam's cost was estimated to be some $1,300,000,000, a huge sum, but justified by Gruening

and the Corps of Engineers because of the expected low cost of power which would be produced.

The *New York Times* reported on Gruening's campaign and on the Devil Canyon study in June 1961 and noted that conservationists and power developers were frequently in conflict over hydroelectric projects. "Moreover, rivalry frequently arises between the Corps of Engineers and the Federal Bureau of Reclamation." Gruening's strategy with regard to the rivalry was to emphasize the comparative costs of Rampart and Devil Canyon power--two mills per kilowatt hour for Rampart against an estimated six mills for Devil Canyon. And Gruening questioned whether Devil Canyon power would even be as cheap as six mills, arguing that the cost would actually be eight mills unless "Congress waived the interest charges on the fifty-year, $500,000,000, project."(15)

It is not clear that the public had much of an opportunity to compare the Rampart and Devil Canyon projects. The Bureau of Reclamation had a very limited forum for presenting its case and the proponents of Rampart did not expend much effort in drawing comparisons. Indeed, there was no way Alaskans could know that their support of Rampart would be useless and that the struggle would set back hydroelectric power development for years. In retrospect we can see that the all-out struggle had just this effect, yet at the time no one could reasonably have presented the competing probabilities cogently.

Efforts to elicit a public attitude did not come to anything. When, for example, the members of the Greater Anchorage Chamber of Commerce reviewed figures on Rampart, Devil Canyon, and a proposed Bradley Lake project presented by its power committee, they were unable to agree on any recommendations. All the group could do was reaffirm earlier requests stating the need for power. As the press reported, the chamber "could not come to an understanding of which project or which interim generating facility would be most advantageous to back."(16)

Who should the public have looked to for disinterested leadership in 1961? Alaska's congressional representatives urged Rampart in terms which excluded other considerations, while Governor Egan's position was not clearly expressed. Organized presentation of the situation was thus left to Gruening and the Yukon Power for America lobby, except for the efforts of the Bureau of Reclamation, the Corps of Engineers, the Alaska

Conservation Society, and the proponents of coal power. In Alaska, only the pro-Rampart voice was a strong one, but, as it turned out, the weight of opinion expressed in Alaska was not decisive.

The argument of conservationists was expressed forcefully by Alaska State Representative Jay Hammond after he and others convinced the state legislature in its 1961 resolution to abandon a blanket endorsement of Rampart. Legislators agreed to call for the federal government's acceleration of biological, mineralogical, and sociological studies in order that they not lag behind engineering feasibility studies. Hammond expressed concern over the effects of Rampart on the fish, wildfowl, and people of the region, and wondered that Alaskans, who repeatedly protested federal land withdrawals, would endorse the huge Rampart withdrawal without question.

Other sources of power should be considered, Hammond suggested, "The Rampart has already, and no doubt will continue, to de-emphasize less imaginative, more immediately available and perhaps more feasible scurces of power. Rampart proponents say that these will not be needed when the great dam is built. "Could it possibly be the converse is also true: if other power sources are developed, would there by any need for Rampart?"(17)

Hammond also questioned the Corps's and Gruening's thesis that cheap and abundant power was the key to Alaska's development. A study of the economy commissioned by the legislature and made by the Arthur D. Little Company denied this thesis, stating flatly that industrial development would not necessarily follow the creation of a large power source.

In the 1964 legislature, Hammond and others checked a move by Rampart supporters to get state funding for dam lobbying. The House resolution cautioned against the use of state funds in promotion of federal action prior to the completion of studies on the project.

An Alternative?

The mounting criticism of Rampart split the ranks of hydropower proponents who feared long-term delays would create a stalemate in the power situation. C. W. Snedden, publisher of the *Fairbanks Daily News-Miner*, threw his support behind Devil Canyon in April 1961. Snedden

argued that "Devil Canyon offers no conflict with the huge, long-range Rampart project. Rather, it offers a first step to lower power costs in the immediate future while we await the necessary but lengthy engineering, authorization and construction periods of a project of the magnitude of Rampart." The Bureau of Reclamation forecasts for Susitna would answer a great need and could reduce power costs to Fairbanks users to a fraction of its present cost: "Less than seven years after the project receives approval from Congress and the President, construction should be completed on the first stage."(18)

Snedden had supported the Yukon Power for America organization but, unlike others, he was prepared to look at alternatives. He perhaps read the signs of Rampart's fate more clearly than did other supporters, or did not agree with their unstated but obvious belief that boosting Devil Canyon threatened Rampart.

The *Anchorage Daily News* editorialized in favor of Devil Canyon on several occasions. In October 1961 it cited the recommendation of the Alaska Chapter of the National Electrical Contractors Association, a group which "once again strongly recommended construction of the Devil Canyon dam." The contractors predicted an urgent need within five years for additional power supplies and observed that Rampart "is still in the dream stage with ten years of engineering and study ahead of it," while President John F. Kennedy and Secretary of Interior Morris K. Udall had already "given the go ahead" to the Susitna project. "Look to the Susitna for immediate needs," urged the *News*, "while pursuing Rampart as an overall super power plant for not only Alaska but all of northern North America."(19) In January of the same year the *News* made the same point: "If there is a choice, which when it comes to getting in on federal monies there must be, it would seem wiser to concentrate on Devil Canyon at this time."(20)

And, once again in May 1961, the same sewspaper editorialized on the dam issue. The report from the Resources Development Corporation was due some time in May, and "around it may swing Alaska's future."(21) According to the editor, the market study would determine the fate of Rampart.

Market Favorable

The Development and Resources Corporation reported in April 1962. Gordon R. Clapp, the research organization's president made it clear in his letter of transmittal to the Corps of Engineers that his team had directed itself to the essential question. "Can the power output of the Rampart project be marketed if and when the project is built?" And the answer after completing the study was conclusive: "We have reached the conclusion that the power output...can be reached." Study of market trends indicated that a demand for the power would follow its existence. Industries requiring cheap power would locate in various regions of the state for the specific purpose of utlizing Rampart power. Not only would industry use the anticipated power from Rampart but would probably require even more. Thus the research organization echoed the old theme of Alaska's boosters: let the government provide the necessary stimulation and development would follow. As Clapp put it: "Rampart should be considered as a stage of the development of Alaska to the benefit of the nation."(22)

Division of Responsibility

According to earlier Corps' pronouncements, the favorable market report should have signaled a significant green light along the road to eventual passage of an appropriations bill for the construction of Rampart. Yet shortly before the report was issued, its impact was negated by an agreement between the Secretary of the Interior and Secretary of the Army. After considerable negotiation, the secretaries had resolved to end the long rivalry between the U. S. Army Corps of Engineers and the Department of the Interior's Bureau of Reclamation, and eliminate the duplication of effort and responsibility in dam projects. Congressmen and executive officers had called for such cooperation for years, and the agreement seemed to bring the long competition to an end. Projects in Alaska, the Columbia River Basin, and the Missouri River Basin were subjects of the compromise. Henceforth the Bureau of Reclamation was charged with responsibility for all economic feasibility and power-marketing studies and the operation of completed projects in Alaska, while the corps would handle engineering studies and construction.

Rampart was treated specifically in the agreement. The corps would complete its studies of the project, yet the Department of the Interior would undertake studies of the projects' effects on natural resources and investigate the marketing potential as well. It is not clear why an agreement to end duplication of efforts would specifically mandate duplication in Rampart's case, unless the feeling existed in some quarters that the study commissioned by the corps might be questionable. At any rate, the agreement opened the way for more studies and effectively limited the corps's overall responsibility for evaluating Rampart. At some future date, the corps would have to render a decision, but would need to consider the findings of the Department of the Interior before acting on Rampart.

The Bureau of Reclamation funded another market study over a two-year period (1963-65) at a cost of $250,000, and the Department of the Interior awaited the results of studies which its various divisions were still carrying on. Meanwhile, the controversies raised by conservationists and sports interests were drawing nationwide attention to Rampart. Senator Gruening had more to worry about now than the slow machinery of government as the public debate widened.

When the U. S. Fish and Wildlife Service warned against Rampart in January 1963, Rampart proponents received their first substantial setback. Now the conservationists and sportsmen had the aid of a strongly worded report from an Interior Department agency to provoke public comment. The odds shifted as a consequence.

Yukon Power for America

Gruening hoped to offset the growing conservationist sentiment by organizing a strong center for pro-Rampart opinion. In September 1963, a meeting was held at Mt. McKinley Park which resulted in the formation of Yukon Power for America, a lobbying group led by the mayors of Anchorage and Fairbanks.

Gruening told the conferees in a keynote address that more unanimity existed for Rampart than had been expressed for statehood, and professed not to understand the opposition of conservationists. Gruening

and others questioned a conservationist view financed by gunmakers, a reference to the support given the Alaska Conservation Society by national sportsmen organizations. Ira Gabrielson, formerly of the U. S. Fish and Wildlife Service, and then director of the Wildlife Management Institute, was specifically attacked.

Sporting interests continued their campaign against Rampart. A newsletter to all Boone and Crockett Club members from the Wildlife Management Institute called Rampart "the greatest boondoggle of all time." Members were urged to protest the expenditure of 1.5 billion dollars in public funds while the market for Rampart power was "uncertain, at best."(23) The important Yukon Wetlands would most certainly be destroyed, warned the club, and these produced one and one-half million ducks, geese, swans, and cranes each year, not to mention numerous other wild birds.

Gruening persisted with his advocacy and found a new agrument in support of Rampart. Studies indicated that Alaska had huge phosphate deposits, he reported to a U. S. Senate Interior Committee, and Rampart was needed to convert the phosphates into commercial products such as detergents and fertilizer.

Gruening worked desperately to offset the public impact of the Fish and Wildlife Service. His arguments before various groups ranged from branding the agency's report as "untrue and unscientific" to his repeated insistence that conservationists believed that "the two-legged species is not entitled to a habitat."(24) People's needs should be considered too, Gruening stated, and the bias of officials of the Fish and Wildlife Service should be disregarded.

An examination of the public discussion in Alaska from 1959 through 1964 shows the force of persistence. In 1961 there had been considerable support for Dev l Canyon. Two major newspapers, the *Fairbanks Daily News-Miner* and the *Anchorage Daily News* favored the Susitna project as an immediate goal which should be pursued, although neither paper pushed particularly hard. Rampart was not to be abandoned, but the papers argued that Devil Canyon construction should be achieved first. But Alaska's governor and its congressional leaders rejected this approach and insisted on reversing the priorities, and influential citizens fell

in line by forming Yukon Power for America, a lobby for Rampart. The very title of the association precluded a consideration of Devil Canyon; it was to be Yukon power, that is, Rampart, or nothing. Conservationists seemed to support Devil Canyon in 1961 too, but as the Rampart proponents hardened their line, it was enough for conservationists to attack Rampart without making more than vague references to other power alternatives.

Conservationists had seemed to favor Devil Canyon as an alternative to Rampart in the early 1960s. Celia Hunter of the Alaska Conservation Society wrote the *Anchorage Daily News* in October 1963 of a "conspiracy of silence" regarding alternatives and urged more consideration of Devil Canyon because of its Railbelt location and its "clean bill of health from the Fish and Wildlife Service biologists."(25) Robert B. Weeden, wildlife biologist and spokesman for the Alaska Conservation Society expressed similar views early in 1964, noting the favorable 1960 Fish and Wildlife Service report: "This project, to me, is a much more sensible one for Alaska. First, we could get it within seven years. Second, it would produce eight times as much electricity as we now use in the whole of Alaska, which should be enough for even dreamers. Third, the power would be available 15 miles from the Alaska Railroad, midway between Anchorage, and Fairbanks. Fourth, it would destroy few valuable resources."(26)

Weeden made no secret of the fact that support for Devil Canyon had strategic significance in the Rampart struggle: "In my opinion, one of the best ways to squelch Rampart would be to stir up the latent support present for other worthwhile power projects--like Taiya or Devil Canyon. News media realize this, and Devil Canyon, for example, is never mentioned any more."(27) The Alaska Conservation Society spokesmen, Hunter and Weeden, appeared to be sincere in favoring Devil Canyon and were not simply bringing forward the Susitna project as a means of halting Rampart.

In March 1964, the Alaska Native Brotherhood adopted a resolution withholding an endorsement of Rampart. Native leaders feared that the rights of Natives of the Yukon were not adequately protected. This resolution directly countered Gruening's insistence that Natives favored the construction of Rampart, and it constituted an alliance between Natives and conservationists. Thus a new element of opposition, potentially a very potent one, entered the picture. From this point Rampart

supporters could not argue that the project would benefit "all the people."

The heaviest blow of all fell on Rampart proponents in May 1964 when the U. S. Fish and Wildlife Service recommended against the dam in a report indicating that the blow to wildlife would be overwhelming. Another came indirectly in the form of the great earthquake which devastated southcentral Alaska in March 1964. Rampart proponents were divided upon the effect of the earthquake on the hydroelectric project. C. W. Snedden argued that Congress would be unlikely to appropriate money for Rampart following the appropriation of large sums for the rehabilitation of southcentral Alaska. Other members of Yukon Power for America felt that the earthquake might engender public sympathy which would be favorable to Rampart.

Trustees of Yukon Power for America met at Sitka in May and were addressed by Governor William Egan and Senator Bob Bartlett. Both speakers urged them to push even harder for Rampart and both affirmed "Rampart will be built"--the familiar rallying cry of proponents. The trustees responded by calling for early construction and insisting that the need for Rampart had not been diminished by the earthquake.

Despite the affirmative line maintained at the meeting, those close to the situation saw that hope for Rampart was dim indeed. Time was running out for the Yukon Power for America supporters. There was nothing they could do after the double blow dealt by the Natives and the U. S. Department of Fish and Wildlife in 1964. The Rampart project continued to suffer as the conservationists accelerated their attacks on the great project, and the final blow came when the Department of the Interior's 1967 report to the Secretary of the Army, *Alaska Natural Resources and the Rampart Project*, contradicted the firmly held positions of Rampart's proponents.

Congress could hardly be expected to provide construction monies unless the need for the project's power had been clearly established. Even then, Congress would have to be convinced that the economic gains offset any anticipated ecological disruptions. On both counts the Department of the Interior's conclusions were adverse to Rampart: the power market did not seem to exist and the ecological effects would be drastic.

Without making direct reference to the Resources and Development Corporation's optimistic report to the corps on the ample potential Rampart power market, the Department of the Interior dismissed its findings: "The fragmentary and inconclusive data available concerning Alaska mineral resources, together with uncertainties with respect to competitive world resources and markets for potential Alaska products, preclude accurate forecasting of the industrial development likely to occur in Alaska with the availability of low-cost power."(28)

The Department of the Interior acknowledged the importance of "aiding Alaska, in the national interest, to develop an economy based increasingly on development and processing in Alaska of Alaska resources," and submitted that Rampart would be a catalyst to such development. "However, a basic requirement of each proposal of federal assistance should be that it constitutes the most desirable means of accomplishing a merited objective and the Rampart project does not stand this test."(29) Thus the department's adverse conclusions were not based on differences with Rampart proponents on the philosophy of goverment, but on matters of economy and ecology.

The Department of the Interior found that the only industry likely to be attracted to Alaska for cheap power was that of aluminum production, and it evaluated the usage and costs which could reasonably be established. The resulting figures showed that power rates would be too high to attract aluminim production to Alaska, and other studies proved that transmission costs of Rampart power to the Northwest would preclude marketing there. "In the absence of such demands for large blocks of the project power tremendous financial investments required for...and the availability of favorable, less costly power alternatives," The Department of the Interior could not recommend construction.(30)

The Department of the Interior noted that its field reports were also reviewed by the University of Michigan. This study, funded by the Natural Resources Council of America, reviewed ecological and economic consequences of the Rampart project as reported by the corps. The Department of the Interior did not further cite the Michigan studies, but knowledge of them could not have influenced the department to favor Rampart. Michigan researchers did not agree that considerable population

and industrial increase could be anticipated and concluded that the Development and Resources Corporation tried to uphold a preconceived position "that Rampart Dam's market would be justified by listing all possible industries that could use up its electrical output."(31)

As for the ecological questions, the Department of the Interior pointed out that the Fish and Wildlife Service had estimated an annual wildlife loss of 1.5 million ducks, 12,800 geese, 10,000 cranes, 20,000 grebes, 13,000 moose, and 3.6 million commercial fur animals. Additionally, between 231,300 and 430,000 anadromous fish would be lost each year. Some mitigation measures could reduce these losses but "full replacement of losses of fish and wildlife resources would not be feasible or possible." Without calculation the loss monetarily, assuming mitigation features such as salmon ladders were constructed, Fish and Wildlife believed "the losses would be so great as to hazard achievement of a favorable benefit-cost ratio for the project."(32)

The Department of the Interior asked the National Academy of Sciences to review the fish and wildlife findings. The academy's review overwhelmingly contradicted the arguments of Rampart proponerts who had argued that losses could be offset by gains:

1. The Yukon Wetlands, with its rivers, vast networks of marshes, and lakes and potholes, is one of the finest fish, wildlife, big game, and small game production areas in North America.

2. Construction of the Rampart dam would destroy the productivity of the Yukon Wetlands in renewable resources, and leave in its stead a huge windswept lake, an unsatisfactory habitat for wildlife.

3. If Rampart dam is constructed, individual animals might survive flooding of the reservoir area, but the likelihood that populations of animals would survive is extremely doubtful. Other habitats to which these populations might migrate are already supporting all the life forms they can.

4. Construction of the Rampart dam would result in the destruction of the valuable up-river salmon stocks. On the other hand, the committee is not convinced that the four proposals for mitigation of the effects on fishing of the Rampart dam are feasible; and, if feasible, that they would be successful.

5. The Yukon Wetlands presently contributes more than one million waterfowl annually to the continental duck population. The proposed waterfowl mitigation measures would be almost prohibitively expensive and would ultimately contribute less than a third of the present waterfowl production. The reservoir would not provide suitable nesting habitats, marshes, and shallow water areas because of its relatively steep banks, rising waters as the reservoir is filling, and later, because of wave action and ice push.

6. Big game, small game, and various fur-bearing animals would also disappear. Mitigation measures for resident game populations are not feasible.

7. It seems inconceivable that serious thought is given to the investment of more than $650 million to support mitigation programs whose feasibility and likelihood of success can only be regarded as extremely problematical. There is need for thorough comparative evaluation of the benefits from both the present situation and those reasonably expected from the proposed impoundment.

8. Construction of the dam would destroy a highly productive area which is presently benefiting the whole of North America at no cost.[33]

Any assessment of the Rampart Dam project raises certain considerations, the chief of which is whether Congress was ever likely to fund such a gigantic venture. It may be that its very size might have created enough enthusiasm, but we can never know with any certainty. Traditionally, Democrats have taken great pride in similar engineering marvels, notably the Grand Coulee Dam and the Tennessee Valley Authority, and the Democrats surged to executive power with John Kennedy's election as president in 1960. Yet there were other national priorities competing for funds in the 1960s, particularly as the Vietnam conflict escalated. Economic considerations aside, the period was one of increasing awareness of the impact of development on the natural environment, and national conservation sentiment against the dam was displayed effectively. Heavy conservationist pressure was brought to bear on the Department of the Interior and such pressure would have been felt acutely by Congress, if the department had recommended construction.

It is certainly arguable that Rampart's prospects were never very good. If this were the case, why did it go as far as it did, and what were the effects of the campaign? In answer to the first question, it seems clear that the dynamic leadership of Senator Ernest Gruening provided much of the impetus. He inspired the project, rallied support in Alaska and elsewhere, and badgered government agencies relentlessly. It was as if Gruening saw Rampart as the climax of his brilliant political career. He insisted that the project was not a visionary or romantic one, but one of the eminent practicality, a means of solving with one blow the decades-long dilemma of the Alaskan economy. He was a wise man and a cagey fighter but could not realize his hopes when too many experts disagreed with his analysis of the dam's value.

Gruening lost his campaign and the struggle had important effects on Alaska. Success gave the conservationists in and outside of Alaska an assurance that inspired their further organizational efforts; and it provided a platform for Native's opposition to federal policies which was to bear fruit in the land claims dispute.

These were positive gains; were there negative results? Some of the proponents of Devil Canyon certainly considered this to be the case. But for Rampart, Devil Canyon might be producing power today.

SUSITNA (DEVIL CANYON)

The history of the Devil Canyon proposal shows complexities beyond those related to the Rampart question.

The nineteenth Alaska territorial legislature, meeting in early 1949 in Juneau, addressed a joint memorial to the President of the United States, the Congress, the Secretary of the Interior, the Bureau of Reclamation and the delegate from Alaska, asking that Alaska be included in the Bureau of Reclamation program with participation under the Reclamation Funds. The memorialists pointed out that the Bureau of Reclamation had operated since 1902 in the western states and played a substantial role in developing irrigation projects and reclaiming lands in that region. Since 1939 the bureau's responsibilities had been enlarged to include the construction of hydroelectric power projects. Inclusion of Alaska into the bureau's program, the memorialists maintained, would result in the expansion of utilities and other services with consequent acceleration of settlement. This, in turn, would strengthen the territory as a buffer area in the interest of national defense.(34)

Subsequently, the Department of the Interior provided $150,000 to be used by the Bureau of Reclamation to update its Alaskan investigations of 1948. The results of these studies were to be used as a basis for legislation authorizing the development of the territory's water resources.

In its final report, published in 1952, the Bureau of Reclamation identified a large number of possible hydroelectric power sites throughout Alaska. The bureau pointed out that, among all the potential rivers, the Susitna River was the most strategically situated of all Alaska streams because of its proximity to Anchorage and Fairbanks and the connecting railbelt. The Susitna River basin occupies the northern half of the Cook Inlet area. It is bounded on the west and north by the Alaska Range, and on the east by the Copper River Plateau. The Susitna River enters Cook Inlet 25 miles west of Anchorage. The main stream originates in a series of glacier-bearing peaks some 90 miles south of Fairbanks and 200 miles north of Anchorage of which Mt. Hayes at 13,940

feet is the highest. For the first 50 miles the river meanders generally southward over a broad alluvial fan and plateau after which it turns sharply westward for 75 miles through a practically continuous canyon incised in a high-level broad valley; it then travels southwest for 125 miles in a broad lowland. The Susitna has five principal tributaries: The Maclaren River originating in the Alaska Range, the Tyone River from the Talkeetna Mountains, the Chulitna River from the Alaska Range in Mount McKinley National Park, the Talkeetna River from the Talkeetna Mountains, and finally the Yentna River system which drains a large portion of the Alaska Range.(35)

The Bureau of Reclamation identified three possible damsites on the Susitna River, labeled sites Nos. 1 through 3. The first was near the upstream end of the 75-mile canyon section some 17 miles below the mouth of the Tyone River. The bureau envisioned a main dam in the steep-walled rock canyon, 100 feet wide at the bottom. A concrete dam some 575 feet high with a crest length of 12,00 feet would create a reservoir with 9,000,000 acre-feet of active capacity. The bureau estimated that a power plant at this site would generate more than 2,000,000,000 kwh of firm energy each year.(36)

The second site was located 36 miles below the first at a location where the valley bottom is less than 300 feet wide and rock slopes rise far above the river at 45° angles. A concrete dam raising the water 425 feet would create a reservoir reaching to the tailwater of site No. 1 and contain some 1,000,000 acre-feet of active storage space. The annual power output at this plant would exceed 2,000,000,000 kwh of firm energy.(37)

The third site, or Devil Canyon Site, was located 30 miles downstream from the second site. At this location, the rock walls rise steeply, almost vertically in places, to heights of 600 to 1,000 feet above the stream. A dam high enough to raise the water 525 feet would have a crest length of 1,000 feet and create backwater to site No. 2. The active storage capacity would be 1,000,000 acre-feet and the annual firm energy production would amount to more than 2,600,000,000 kwh.(38)

The Bureau of Reclamation had focused attention on Alaska's vast water resources, pointing out that more than half the hydropower potential remaining in America was found in the territory. And, in order to meet some of Anchorage's power needs, Congress authorized the Bureau of Reclamation to build a relatively small installation at Eklutna near Anchorage in the early 1950s.

Since the early 1950s, both the Bureau of Reclamation and the Corps of Engineers have conducted studies identifying the various viable hydropower sites in Alaska. After release of a favorable feasibility study in May of 1960, formal review was initiated in 1961. The Department of the Interior proposed authorization of Devil Canyon and Denali, and transmission facilities to Anchorage and Fairbanks. At a cost of $498,874,000, the project was designed to produce a large block of low-cost power serving as a catalyst, according to Secretary of the Interior Stewart L. Udall, for expanding the population and bringing industrial development to the railbelt area.

Unfortunately, the Department of the Interior's timing paralleled initial moves on the Rampart project by the U. S. Army Corps of Engineers. Shortly thereafter, the Department of the Army recommended deferring any action on Devil Canyon until the Rampart studies were completed. For all practical purposes, the recommendation shelved the Devil Canyon proposal for the time being.(39)

Some Alaskans continued to advocate Devil Canyon. William A. Egan, Alaska's governor, voiced his concern that, despite predictions of a doubling of energy demands within ten years, virtually no additional power generation facilities were under construction. The governor also urged that the six-mill estimate for Devil Canyon be reappraised since Alaska needed low-cost power for industrial development. Various chambers of commerce supported the Devil Canyon project as did the Alaska Chapter of the National Electrical Contractors Association. The latter organization had put on a drive "to sell electric heat." It had received a guarantee of cost of operation to the consumer from both the Chugach Electric Association and the Golden Valley Electric Association. The new rates made electric heat competitive with oil and gas heating. "The public is hungry for the all-electric house" and "quite a number of

buildings have been contracted for without any publicity. So we are bound and determined to sell more power than they have available, and to force a development of electric power generation." But despite support for Devil Canyon, it was the Rampart proposal which had captured the public imagination. Described as "the daddy of all power projects" on the North American continent by its proponents, it did not matter that the proposal was still in the "dream stage" and needed at least ten years of further studies. The sheer size of the grand project attracted many supporters. Devil Canyon paled in significance when compared to Rampart.(40)

The Army-Interior agreement of 1962, already referred to, had assigned leading responsibilities for comprehensive hydropower development investigation in Alaska to the latter department. The agreement had assigned design and construction responsibilities for Alaska water projects to the Corps of Engineers. While the corps prepared a Rampart study, the Bureau of Reclamation contributed a natural resource and power market investigation to the corps's project, but also accomplished considerable additional work on the power potential of the Upper Susitna. The Department of the Interior issued its report, entitled "Alaska Natural Resources and the Ramparts Project," in 1967. In it, it appraised the various power alternatives and proposed a tentative plan for the railbelt area. The investigators recommended an initial interconnection of the Anchorage and Fairbanks areas and construction of well-head, gas-fired thermal plants in the Cook Inlet area, together with such mine-mouth, coal-fired thermal plants in the Cook Inlet and Healy areas as appeared economical. For the near future, the Department of the Interior envisioned the expansion of thermal plants because of the relatively low construction costs involved, but also recommended the construction of hydroelectric developments, such as individual dams on the Upper Susitna River and the Bradley Lake project. The department realized that the costs of hydroelectric power development consisted almost entirely of very high construction investments. Since hydropower must be generated near the site of falling water, it often requires extensive and expensive transmission facilities as well. The principal advantage of hydropower is that electricity is generated from falling water, a renewable resource

which is free. Furthermore, operation and maintenance costs are very minor. Competing thermal plants, while relatively cheap to construct, are susceptible to rising fossil-fuel costs throughout the life span of the installation and also are relatively expensive to maintain and operate.[41]

While most studies by federal agencies and railbelt area utilities after the 1967 Department of the Interior report focused on the generation of electricity by low-cost Cook Inlet gas, interest in the Susitna project continued on a low level. Finally, in January of 1972, the U. S. Senate Public Works Committee, at the urging of Senator Ted Stevens (R., Alaska) passed a resolution calling on the Corps of Engineers to study the Upper Susitna and a 1973 resolution by the Alaska State Legislature requested the Department of the Interior to update its feasibility report on the Susitna project. In response, the corps requested the necessary funds from Congress for its 1974 fiscal year budget to undertake the study. The Office of Management and Budget, however, disallowed the funds.[42] Obviously, it did not consider the Alaskan project to have a high priority.

Energy Crisis

A new urgency in looking at alternatives to fossil fuels had been forced upon the United States by the Arab oil boycott in 1973. In an effort to bring about a change in American policy toward Israel, the Arab countries had cut off oil supplies to the United States. The pressure to develop reliable domestic energy supplies became almost irresistible. By late 1973, Americans were shivering through a cold winter and debated the energy crisis. And, perhaps for the first time, most realized that the era of cheap and plentiful energy had come to an end.

Appropriately enough, Senator Mike Gravel (D., Alaska), the chairman of the Senate Water Resources Subcommittee, announced in January of 1974 that his group had authorized the expenditure of $50,000 for updating the 1960 Bureau of Reclamation feasibility study of the Susitna project. The Army Corps of Engineers was to complete the study that very same summer and as early as 1975 Congress could be asked to authorize

a study of the site and design for the project. An appropriation to begin construction, if all went well, could be proposed as early as 1976.(43)

Early in that same year the other members of Alaska's congressional delegation, Senator Ted Stevens (R., Alaska) and Representative Don Young (R., Alaska) introduced legislation which would authorize construction of the Susitna project. Under the terms of the pending bills, the corps would receive approximately $1 million to begin design work based upon a review of the prior work performed by the Bureau of Reclamation. It would also allow a preliminary analysis on transmission lines and marketability of Susitna power by the Alaska Power Administration.(44)

Agency Involvement

Of the federal agencies which have become involved in the development of hydroelectric power in Alaska, the two most important are the Department of the Interior, through its Bureau of Reclamation, and the Corps of Engineers. The former has had a long-standing interest in hydroelectric development, dating back to 1906. In that year, Congress provided for the development of power in addition to water control for irrigation and other purposes. The Bureau of Reclamation originally inventoried the hydroelectric potential of Alaska in the late 1940s. The only actual development based on these investigations was the Eklutna project near Anchorage, completed in 1955, which is discussed in detail elsewhere.(45)

As early as 1912, Congress instructed the Corps of Engineers to include hydroelectric potential evaluations in its survey reports. Since that time, the corps has developed hydroelectric proposals and submitted them to Congress for authorization. Normally, the corps also operated the projects it constructed. In 1944, Congress directed that electricity generated at multiple-use reservoirs under corps jurisdiction be turned over to the Department of the Interior for marketing. And although the corps established its Alaska District in 1946, so far it has constructed only the Snettisham project, begun in 1967 and completed in 1973. But Juneau did not receive dependable power until 1976 because of transmission line failures.(46)

The 1962 agreement between the Secretaries of the Interior and Army made the Bureau of Reclamation the planning, marketing, operation and maintenance agent while the Corps of Engineers became the design and construction agency. Finally, in 1967, the Department of the Interior withdrew the Bureau of Reclamation from Alaska, and in its stead established the Alaska Power Administration (APA) on June 16, 1967. APA took over the staff and property of the Bureau of Reclamation, and maintains, operates, and markets the power from the Eklutna and Snettisham projects. APA also plans the development and use of Alaska's water power, analyzes future electricity demands, and studies electrical transmission needs. For example, APA actively participated in the study of the Upper Susitna Basin.(47) APA, an agency within the Department of the Interior, apparently was established to deal exclusively with Alaska's hydroelectric potential.

The Federal Power Commission and the Rural Electrification Administration (REA) are also involved in Alaska's hydroelectric development. The former grants licenses for nonfederal developments on federal lands, collaborates with the corps in evaluating the economic feasibility of new projects, approves power rates set by APA, reviews federal hydroelectric developments, and possesses broad powers for planning. The latter, established by Congress in 1936, makes loans for rural electrification. Several REA cooperative electric utilities operate in Alaska, the largest of them the Chugach Electric Assocation of Anchorage.(48)

The Corps of Engineers and the Bureau of Reclamation had a history of vigorous competition in Alaska hydroelectric planning and development. As already stated, the 1962 agreement between the corps and the Department of the Interior did delineate the roles of the two agencies, but friction apparently continued. For, as recently as 1975, APA expressed a desire to enlarge its responsibilities by undertaking all preauthorization planning, including so-called Level C or implementation studies. If APA succeeds, this would give it complete responsibilities in all federal water resource planning responsibilities, ranging from broad assessments of regional water resource needs to carrying out specific engineering and design projects.(49)

By 1974, much work had been accomplished on the Susitna project. The Alaska Power Administration, provided with such a headstart, completed the updating of the 1961 Bureau of Reclamation report on the Devil

Canyon project on the Upper Susitna. The study included a more sophisticated design, fresh cost estimates, a brief analysis of the power market as well as environmental and economic assessments, and reaffirmed the desirability and feasibility of the project.(50)

In that same year, the Alaska State Legislature passed additional resolutions urging the development of hydroelectric resources generally and supporting the Devil Canyon project specifically. Also in 1974, the Federal Power Commission published its Alaska Power Survey. It concluded a statewide survey of existing and planned electrical generating systems and an assessment of future needs and alternatives to the year 2000.

In the meantime, the State of Alaska, impatient with federal delays, had hired the Henry J. Kaiser Company to reassess the Susitna project. The consultants proposed yet another scheme, the construction of a high dam upstream from Devil Canyon, in lieu of the Bureau of Reclamation initial development plan of Devil Canyon plus Denali for the first phase. Kaiser was considering the establishment of a large aluminum plant in the railbelt area which was contingent upon the availability of large blocks of cheap energy.(51)

Early in 1975, the Department of the Interior learned that the Corps of Engineers had concluded that extensive additional foundation studies would have to be undertaken on the Susitna River before any final decision could be reached. The corps recommended construction at the Devil Canyon and Watana sites as the first stage plan. The Department of the Interior was concerned because the corps' plan would likely preclude the dam at the vee site which it favored and which amounted to well over one billion killowatt-hours annual energy potential, a significant portion of the total Susitna potential.(52)

Actually, the Department of the Interior had been uneasy about the foundation at Denali for a long time. It considered the site feasible for an earth dam, but had always preferred an alternative site if one could be found. The 1961 Devil Canyon Report and the 1974 Status Report had included very conservative design and cost assumptions for Denali so as to provide reasonable assurances of overall feasibility. On this basis, the department considered the Devil Canyon and Denali plans an

appropriate basis for seeking Congressional authorization. But, unless the corps provided further details on their new studies, the department saw no reason for endorsing the change in plans.(53)

Meanwhile, the conservation-minded administration of Governor Jay S. Hammond became involved in the Devil Canyon project when it created an ad-hoc task force chaired by Commissioner of Commerce and Economic Development Langhorne A. Motley. The task force reviewed the Corps of Engineers's proposal prior to its submission to Congress. Early in 1976, Motley's group recommended that the administration endorse the corps request for Congressional authorization of the project and further funds for preconstruction planning. It requested, however, clarification of several points in the corps analysis. The task force pointed out that extensive further studies were needed to supply answers to complex administrative, biological, environmental and socioeconomic questions. Biological studies alone, ranging from salmon enumeration to spawning and rearing, and from moose and caribou habitat to that of various small fur bearers, were estimated to cost $3,709,000 between 1977 and 1981. The task force also proposed that the Corps of Engineers have the Alaska Power Administration develop a mechanism through which appropriate state, federal, and local governmental authorities could participate in the design and review the investigations designed to produce answers to the many unanswered questions.(54)

Early in 1976, Alaska's mercurial U. S. Senator Mike Gravel (D., Alaska) decided to assume leadership in the drive to get the Susitna project underway. On March 26, 1976, the senator addressed the Alaska legislature on the subject of hydroelectric development in the state. He pointed out that the Corps of Engineers had completed its Devil Canyon study and would soon send its report and an environmental impact statement to Congress recommending authorization of a two-dam system, estimated to cost $1.5 billion, considerably more than the 1974 estimated cost of $682,000,000. The next step would be to seek Congressional authorization of the project. Gravel, as chairman of the Senate Water Resources Subcommittee, felt confident of securing authorization. But authorization was only half the battle--it would still be necessary to secure financing. Both Republican and Democratic adminstrations had expressed the desire to decrease federal participation in such public

work projects, and repeatedly recommended that the beneficiaries of water resource projects should bear in full the cost of construction, operation, and maintenance of such projects. Although Congress had not yet acted on these proposals, Gravel felt that it was only a matter of time until these suggestions were accepted by the lawmakers.

While Congress dawdled, the administration had been cutting Corps of Engineers' programs through the budgetary process. Its total program, Gravel stated, had been funded at less than half that of ten years ago. This allowed for finishing projects underway and operating and maintaining completed projects. It did not allow new construction and very few surveys. Clearly, the handwriting was on the wall. The federal government obviously intended to phase out federal involvement in water resources projects. Additionally, the nation perceived Alaska to be a wealthy oil state. Too long had the state been coddled by the federal government. The senator explained that, in fiscal year 1974, Alaskans had paid .18 percent of the total tax burden of the entire United States. Total federal spending in Alaska amounted to slightly more than twice what Alaskans had paid in taxes. Dollar figures were even more impressive. In the same year the federal government had spent approximately $1,321 per capita in the United States, while in Alaska this amounted to $3,401 per capita. Congress, he predicted, would tell the state to use its own fossil energy sources rather than asking it to purchase an alternative energy source with other people's tax monies.(55)

Gravel described several Corps of Engineers' projects in various parts of the country and concluded that it had taken an average of 18 years from the time of authorization to the receipt of the first construction funds. For years, he continued, the corps had been criticized for cost overruns on its projects when, in fact, "most overruns are a product of erratic cash flows necessitated by federal budget constraints."(56)

Devil Canyon was estimated to cost $1.5 billion and would be the largest corps' project ever, both because of inflated costs and the scope of the undertaking. The advanced engineering and design work alone, Gravel asserted, was to cost $50 million over a four-year period. At an average of $12.5 million per year, that amounted to over 50 percent of the money requested for advanced engineering and design for all projects in the federal 1977 fiscal year budget. In other words, a

project benefitting a little more than one tenth of one percent of the total American population would be using better than 50 percent of available funds designated for all projects.(57)

Senator Gravel argued the urgent need for a break with tradition. Alaska must rely upon another means of financing hydroelectric projects. The senator proposed that Congress appropriate monies to a revolving fund equal to the phase one or the advanced engineering and design portion of any one project. The sponsoring state agency, in this case the Alaska Power Authority, soon to be created by the state legislature, would issue bonds based on the proposed project to pay the corps for the phase-one work. In the event that the proposed development was not feasible, the federal-revolving fund monies would be used to pay off the state bonds. If, however, the proposed project proved to be feasible, the Alaska Power Authority would issue revenue bonds and contract for the work. Under the Gravel plan, the federal-revolving fund would act solely as a guarantee for the phase-one costs incurred by the state sponsor.(58)

Senator Gravel proposed broad new legislation, the Hydroelectric Power Development Act of 1976, which would establish a revolving fund and stipulate that the federal government would assume the responsibility of paying all cost increases caused by any delays in construction or unforeseen contingencies of various kinds. If, for any reason, the project was terminated before completion, the federal government would fully reimburse the sponsoring state power authority for any losses suffered.(59)

Comment on the senator's proposal was not confined to its novel aspects of financing, but showed the range of opposition to hydroelectric projects. A conservation agency, the Fairbanks Environmental Center, opposed the project, claiming it could not be justified environmentally or economically. Specifically, the center asserted that the project would "have major biological impact and will destroy a unique wilderness river basin." The Devil Canyon project, a two-dam system, would flood some 50,500 acres of the Upper Susitna River, disrupting the migratory patterns of the Nelchina caribou herd, destroying much of its habitat, and subjecting it to increased hunting pressure. Much moose habitat would be flooded as well, lowering the carrying capacity of the area

while control of the hydrologic balance of the Susitna River could have a significant impact on the downstream fisheries, particularly the salmon.

The *Anchorage Daily Times* ignored the major issues and expressed opposition to the corps's proposal to build elaborate recreational facilities at the two manmade lakes at a cost of $2 million. It sounded like a good idea, the editor stated, "that is, if your idea of outdoorsing it is to run your recreational vehicle up to a unit, climb in your boat, and roar around the lake, return, have dinner and a couple of shots in your motor home and maybe watch a little TV before retiring. . ." The editor concluded that, at one time, the few Alaskans who went camping did so for the fun of it, and it rarely involved more than "a sleeping bag, a tent or an evergreen bough lean-to, and a hatchet for firewood." The value of the outdoors was that it was outdoors and, by definition, very different from indoors. Trees and animals did pretty much what they wanted to and did not share their homes with permanent rock fireplaces, hiking trails, snowmachines, and motorized campers.(60)

Bud Shultz, the general manager of the state's largest electrical utility cooperative, Anchorage-based Chugach Electric Association, Inc., stated that the Devil Canyon project "just does not make economic sense." The power from the project would be too expensive, Schultz asserted for, in 1976, Chugach customers paid 24 mills for their power at retail prices, and only 11 mills at wholesale prices. Devil Canyon power, on the other hand, was estimated to cost 21.9 mills at wholesale prices--and that was in 1975 dollars. By the time the project finally produced any power, Schultz feared, the price probably would have tripled. The general manager pointed out that Chugach had long-term commitments to purchase cheap fuel, principaly gas, to run its generators.(61) What Schultz did not recognize, however, was that the federal government probably would prohibit the use of natural gas for power generation altogether in the near future and allocate that valuable resource for higher use.

On June 10, 1976, Senator Gravel finally introduced two measures--one authorizing the construction of the Watana and Devil Canyon units of the Upper Susitna Basin project and related transmission facilities

together with implementation of the Hydroelectric Power Development Act of 1976 to facilitate the construction of hydroelectric power projects by the Corps of Engineers.(62)

The second measure sought to facilitate the senator's scheme to have state power authorities finance the construction of hydroelectric projects as fast as engineering capabilities demanded.

At the end of June the Corps of Engineers did not, as expected, recommend the immediate authorization of the project. Instead, it stated that feasibility studies justified funding for a fuller evaluation in order to determine whether or not the investment of large sums needed for development of the project were warranted.(63) There were reactions to Gravel's financing proposal as well. Unofficially, the Alaska Power Administration opposed his financing scheme. Although this body favored the concept of nonfederal financing of power developments wherever possible, the agency feared the senator's approach would lead to exceptionally large federal monetary obligations because of the language of the Gravel proposal. It believed that substantial federal obligations should be controlled through a process of congressional authorization on a project-by-project basis.(64)

Arguably, this negative assessment owed something to the fear that its functions would be assumed by a state power authority. In formal testimony before the Water Resources Subcommittee of the Senate Committee on Public Works, Robert J. Cross, the administrator of the Alaska Power Administration stated that his agency considered the development of Devil Canyon entirely feasible. As for Gravel's financing scheme, Cross pointed out that it was "obvious that the bill covers areas that are far beyond the expertise and jurisdiction" of his agency and "would involve substantial shifts of responsibility in federal water programs, and that other regions of the U. S. would be affected."(65)

At the time Gravel had unveiled his financing scheme, a measure to create the Alaska Power Authority was pending before the state legislature. Introduced by legislators Jim Duncan and Red Swanson in response to power needs in southeastern Alaska, the proposal was admirably suited to fulfill Gravel's conception of the state's role. After intensive infighting between the "boomers" and controlled-growth factions within the Hammond administration, the Alaska Power Authority emerged. As a public corporation within the Department of Commerce and Economic

Development, but with a separate and independent legal existence, the new body is charged with responsibility to promote, develop, and advance the prosperity and welfare of Alaskans by providing a means of constructing, acquiring, financing, and operating hydroelectric and fossil fuel generating projects. The Alaska Power Authority is to use monies from a revolving fund for funding feasibility studies, preconstruction engineering, design, and construction of power projects. As such, the authority was to provide low-cost monies to assist utilities in developing new generating capacities and also act as a wholesale power supplier.

One observer of power development in Alaska noted that there had been real concern that the Alaska Power authority might evolve into an uncontrollable force for development. For this reason, a delicate system of checks and balances was written into the authorizing legislation. The authority was to determine power needs, determine priorities, and assist with its bonding authority or serve as a project developer and marketing agent. Power development proposals were to be submitted to the governor for review by affected state agencies. After review, the chief executive is to forward the proposal to the legislature with his recommendations. The Alaska Power Authority bonding authority would have to be activated by a joint resolution of the legislature, subject to the governor's veto. And since the Hammond administration prefers the separation of the planning and construction functions of its public works-related agencies, the Division of Energy and Power Development has been established in the Department of Commerce and Economic Development to complement the Alaska Power Authority. The Division of Energy and Power Development is charged with formulating a power development plan for the state, while the Alaska Power Authority has to perform its functions in accordance with this plan.(66)

In September of 1976, the Devil Canyon project cleared its first major legislative hurdle when formal studies of the project were approved by the Senate Public Works Committee. The dam was part of a package of projects approved. Funding authorizations, however, were delayed until the start of the federal government's 1978 fiscal year beginning October 1, 1977.(67) It soon became apparent, however, that the Water Resources Development Act of 1976 could not be approved because the conference committee determined that disparities between the House and

Senate versions of the measure were too great to be resolved before Congress adjourned. At the last minute, conference committee members decided to give negotiations another try. They continued their efforts until an acceptable bill was hammered out which both houses then accepted and which President Carter signed. The legislation, besides including funding for 149 public works projects in all 50 states, provided $25 million for the first phase of the Susitna project under Gravel's financing scheme.(68)

A month later, Senator Gravel urged state officials to order sale of revenue bonds by the Alaska Power Authority to get the first phase of the Devil Canyon project started in the summer of 1977. In case no bonds were sold, Gravel pointed out, federal funds would not be available until October 1, 1977, again delaying the project. The senator suggested the state immediately provide $100,000 to the Corps of Engineers to enable it to prepare a plan of study, including firm data on the cost of the project. The study then would provide the basis for the sale of state bonds to fund an early construction start.(69)

By early 1977, the state had taken no steps to sell revenue bonds and no money had been provided for the corps to prepare a plan of study. Instead, the State Department of Natural Resources had entered the picture by coordinating a cooperative study, involving state, local, and federal agencies designed to identify problems and collect, compile, and analyze information on water and land resources and resource problems in the Susitna Basin. The study, once completed, was to provide the various agencies involved with a basis for planning and resource management decisions regarding the Devil Canyon project. This action further muddied the waters.

Contrary to Senator Gravel's expectations, the Senate-House Conference Committee on the appropriations bill deleted the monies for Susitna in July of 1977. All was not lost, however, because Senator John Stennis (D., Miss.) received assurance from the House conferees to hold early hearings on the merit of the Susitna proposal. Senator Gravel once again expressed optimism and stated that he would "press hard for an appropriation in the Supplemental (appropriation in the fall) and expect that (his) efforts will meet with success."(70)

Since July 1977, Alaskan newspapers have been relatively quiet about the Susitna Project. Conservationists have continued to express their concerns. In the winter of 1977, the Denali Citizen's Council told Governor Hammond that the Susitna project was "scaled beyond the wildest needs of the Anchorage area and Southcentral region" and would "produce a tremendous glut of cheap power...which will not only invite but make practically mandatory the state's inducement of large industrial electric power users to move into the Susitna region to accomplish a rapid pay-back of this gargantuan federal pork barrel." The council asserted that the estimated cost of the project amounted to $7 billion, which made it safe to assume that "it will run at least twice that... ever see a corps project in Alaska that didn't double its estimated cost?" The council asked the governor if he intended "to provide the Teamsters and all the other crooked unions in this state with another big-boom chance to rip off the state and people of Alaska." If the governor intended to follow this course, the council assured him he "could hardly support a bigger mess than this $14 billion boondoggle." The council stated that Alaska needed stability and a chance to build a better, not bigger society in Alaska. Last but not least, "the Susitna hydroproject is far greater in size than conservationists ever consented to when they pointed to Devil Canyon as a possible alternative to Rampart. What tney spoke of was a modest hydroproject that would flood only several square miles at most in Devil Canyon. This gargantua would flood over 82 square miles for 80 miles upriver!" The council urged the governor to "keep our developments small and Alaskan. Show that development can be in harmony with the environment--natural and human."(71)

Alaskan opponents of the project probably rejoice that the Susitna project seems to be stalled for the moment. George Matz, the director of the Fairbanks Environmental Center, probably expresses the concerns of those opposed to Susitna best. Calling the project "a strange hybrid between a dinosaur, octopus, and fox," he worries that, if built, it will dictate rather than respond to the future lifestyles that will predominate in Alaska. If completed on time in 1990, Susitna would provide three times the amount of energy now used by the Anchorage and Fairbanks load centers. The surplus power, Matz asserts, would undoubtedly be used to stimulate and subsidize industrial and population growth in both

the Anchorage and Fairbanks metropolitan areas. This prospect is not appealing to the members of the Fairbanks Environmental Center.(72)

Actually, total area electric power requirements in 1972 amounted to about 2 billion kilowatt-hours, representing some 77 percent of the estimated total statewide electric requirements for the year. Mid-range growth estimates for the Alaska Power Survey indicated that these requirements would increase to approximately 5 billion killowatt-hours in 1980 and that this figure would double by 1990. According to estimates, the full four-dam potential of the Susitna project, however, would deliver only some 7 billion kilowatt-hours annually--a little over 70 percent of the estimated 1990 railbelt area power requirements.(73)

On the federal level in Washington, the Susitna project has not surfaced again in Congress, busy with debating President Jimmy Carter's energy proposals, among other issues. No doubt, the issue of hydroelectric development in Alaska is part of a national contest between the proponents of economic growth and those advocating "zero growth." Groups like Friends of the Earth, the Sierra Club, and various other environmental organizations together with their Alaskan affiliates advocate a concept they call "voluntary simplicity." This calls for a substantial lowering of the American standard of living. In energy matters, they are followers of British physicist Amory B. Lovins who rejects present federal policies which essentially represent an extrapolation of the past and rely on rapid expansion of centralized high technologies to increase supplies of energy, especially in the form of electricity. A mammoth project like Susitna clearly belongs in this category.

Alaska's Susitna project has become embroiled in a conflict between traditional liberals committed to economic growth and material progress, and the contemporary environmentalists who oppose unlimited growth and remind us that we live in a world of scarce resources. Indeed, scarcity is the modern planner's penance for sins committed by the traditional liberals in their attempts to dominate nature. There are ideological undertones in the environmental movement. In their rhetoric, environmentalists remind mankind of its imminent doom and the sinfulness of his profligate nature. But like the traditional liberals, environmentalists often are intolerant and unwilling to permit the individual free choice.

When the Susitna project emerges again, there undoubtedly will be demands for a new environmental impact statement before permission is given to advance the project to the planning stage. Environmentalists are prepared to criticize such a statement as inadequate and incomplete. They will point out that the energy demand projections assume a substantial growth of energy-intensive industries in the vicinity of Anchorage which, they maintain, is purely speculative. Therefore, much of the power produced will be superfluous. Furthermore, risks are high. The Upper Susitna has a subarctic climate, and the Corps of Engineers has never built a dam under those climatic conditions with the attendant danger of substantial ice build-up. Finally, the area lies in a very active seismic zone. Earthquakes of an intensity up to and exceeding 8.5 on the Richter scale are entirely possible. Could a dam be built to withstand such forces? Perhaps, but only time will tell.(74)

Whatever the course of the Susitna project, those who support and those who oppose it will reflect on the history of the Rampart proposal. It is clear that the advocacy of Rampart delayed Devil Canyon at a time when its construction might have been pushed through against comparatively slight resistance. Advocates of Rampart who now favor Devil Canyon might wish they had not committed themselves so singlemindedly earlier. On the other hand, those who now oppose Devil Canyon may be encouraged by the shelving of Rampart to believe that similar forces can be mobilized to stop the Susitna project. Of course, conditions are different. In very important aspects, the two projects are not parallels. Yet, as rallying points for sustained public pressure from various interest groups, they share many similarities.

As has been shown, legislative action in Juneau and Washington, D. C., made Gravel's financing scheme possible. The state legislature passed the 1976 Alaska Power Authority Act, while the Water Resources Development Act of 1976 authorized a new procedure for public, non-federal financing of federally constructed hydroelectric projects. It is also clear that the federal functions performed by the Alaska Power Administration, the Corps of Engineers, and the Federal Power Commission closely parallel the responsibility of the state's Alaska Power Authority and Division of Energy and Power Development. Federal and state review as well as an assessment of public opinion are assured through the environmental impact statement process. The federal hydroelectric

development process is extremely cumbersome, but it offers opportunities for the consolidation of opposition and for a full debate of the issues. Federal involvement also assures consideration of the national interest and, of course, offers the advantage of financial subsidies.

The pertinent state agencies are presumably more responsive to local needs, but, to the extent that developments are funded out of the general fund rather than from power sales from projects, they are more expensive. Undoubtedly, the federal agencies will slowly withdraw their activities in hydroelectric planning and development from Alaska. This, however, excludes the Federal Power Commission which will retain its regulatory and licensing role.

Once the responsible state agencies have become fully operational, electric utilities will increasingly turn to them for timely planning and development aid. Once the state has assumed full responsibility for power planning and development, where will this leave the various interest groups?

Pressures for developing Alaska's resources are overwhelming at times. The impact of strong dissenting opinions on the state decision-making process will focus attention on available alternatives and hopefully prevent colossal blunders. But much will also depend on the inclinations of the chief executive and the makeup of the state legislature. In late 1977, one year before the election, the powerful *Anchorage Daily Times* already has launched a campaign against Governor Hammond, regularly attacking him as a "no-growther." The paper has powerful allies in this attack in Teamster boss Jess Carr and former governor Walter J. Hickel. Too often Governor Hammond instead of boasting of his administration's careful approach to economic development, has gone on the defensive and cited the economic growth fostered by his administration.

In the final analysis, the Susitna project was not delayed by opposition from the conservationists, but rather by the cumbersome and protracted federal hydropower development process as well as the disinterest of various chief executives to the power needs of Alaska.

CONCLUSIONS

By tradition, historians are reticent to conclude that certain causative factors have produced clearly defined results or a specific situation, yet it does appear that the Rampart-Susitna hydroelectric projects have been closely intertwined and that emphasis on the one has affected the other. We have been dealing with a situation which has emerged as the result of an assessment of certain priorities and strategies, but not one in which a direction was determined with full anticipation of the results. It is obvious that the political process has a bearing upon the authorization of hydroelectric projects in Alaska. Advocates of a particular project or a particular means of solving a hydroelectric need have not been tempted to present their position to the public in such a way as to promote a clear debate on the most effective course of action. Their failure to do this does not proceed from an attempt to deceive or to mislead the public. Rather, they act from their conviction that their position has to be represented as strongly as possible. Essentially the Rampart proponents have argued that their project represented the highest good, and in making this argument they convinced themselves that their project represented the only feasible possibility. Environmentalists, on the other hand, have concentrated their efforts on showing the unsoundness of Rampart, and, with the help of adverse reports from federal agencies, could do so effectively. Their advocacy of alternate hydroelectric or other power alternatives has been tentatively expressed, and had been hardly strong enough to open a general public consideration. Of course, it is not the policy of environmental groups to foster any hydroelectric projects. Their favoring the Susitna project has been understood, where it has been appreciated at all, as merely a diversionary tactic. What has been lacking has been the leadership of other individuals or organizations free from commitments to the Corps of Engineers, the Bureau of Reclamation, the Gruening group, or the conservationists, who might have presented the issues on a less partisan level. The editorial efforts which have been made by a couple of newspapers have not been enough to keep the Susitna project alive in the face of the aggressive Rampart advocacy. We are not insisting that the Susitna project was then or is

now the best solution to Alaska's power requirements, but only pointing out that a significant consideration of other alternatives could not have occurred within the adversary framework that has developed.

Who should have tried to extend the power debate? Ultimately, that responsibility should have been assumed by the elected officials of the state. For good reasons, these officials had to be concerned with tactics and advocacy. An all-out effort to throw open a full discussion of the problem jeopardized Gruening's Rampart position and the commitment which the state officials sincerely believed necessary. Thus they were drawn into the "all or nothing" approach which was the result, if not the intention, of the unfortunate determination of the Gruening-led Rampart forces. We must reiterate that neither corruption nor misrepresentation was involved. Quite simply, the situation has evolved as it has due to a choice of strategy in reaching a desired political conclusion. We need not say that the wrong decisions were made, but we can see that the decisions made determined the present status of the Susitna project.

NOTES

1. Anchorage Daily Times, September 22, 1959.
2. Anchorage Daily News, October 6, 1959.
3. Ibid.
4. Fairbanks Daily News-Miner, February 3, 1961.
5. Anchorage Daily Times, April 4, 1961.
6. Ibid.
7. Anchorage Daily Times, March 27, 1961.
8. Ibid.
9. Anchorage Daily Times, March 2, 1961.
10. Ibid., September 13, 1960.
11. Fairbanks Daily News-Miner, September 14, 1960.
12. Anchorage Daily Times, September 13, 1960.
13. Fairbanks Daily News-Miner, May 5, 1961.
14. Fairbanks Daily News-Miner, August 9, 1961.
15. New York Times, June 18, 1961. A large sum, yet according to the Alaska Industry magazine (Sept. 1977) $2 million less than that projected for the much smaller Devil Canyon project in fall, 1977.
16. Anchorage Daily Times, July 21, 1961.
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Study of Susitna choices omits human factor

Daily News-Miner, Fairbanks, Alaska, Wednesday, April 23, 1980—11

Celia Hunter

Opinion

The Susitna Dam project: to build or not to build. The Alaska Power Authority toured the railbelt this past week, holding public meetings in Fairbanks, Wasilla, Palmer and Anchorage, explaining the plan of study designed to determine the project's feasibility economically, environmentally, and from the standpoint of seismic and geologic risks.

Attending the Fairbanks meeting, I was impressed and depressed by the assumptions implicit in APA assessments of Susitna dam viability. Eric Yould, executive director of APA, voiced these assumptions:

1) that railbelt demand for electrical power will expand to absorb all of Susitna's production capacity by completion date;

2) that environmental costs are tolerable (hence the relatively short period allotted for field studies).

The political impetus behind dam construction is stimulated by a number of factors; Mike Gravel has seized upon it as a major campaign plank in his bid for re-election; his position on the U.S. Senate's Public Works Committee has enabled him to keep the project alive and struggling.

Construction dollars and jobs are seen by many as a major benefit, although the high unemployment figures, epecially in Fairbanks, are a legacy of our last major construction boom: the oil pipeline. Construction jobs often increase residual unemployment rather than alleviating it in the long run.

And an implicit assumption is being made about the growth of the railbelt area—a decision that growth is good and should be encouraged. Every possible means of [illegible] has not been presented to [illegible] living there in a form which could elicit their opinions.

Based upon the reactions of railbelt residents to the comparatively mild growth stimulus posed by state land disposals this past winter in the Yanert, Chase, etc., these folks are pretty generally opposed to increased population pressure and its effects on their lifestyles. Dam construction activities, plus construction of a high-voltage intertie transmission system linking Fairbanks and Anchorage will compound growth problems far more drastically than land disposals, plus increasing local vulnerability to massive power network failure such as paralyzed New England and New York City within recent memory.

One feature of the proposed studies which nags insistently for more attention is the exploration of alternatives to construction of the Susitna Dam. A mere 3 per cent of study funds is budgeted for these studies and their format harks back to the major assumption again—the alternatives selected, including nuclear, coal, natural gas, petroleum, solar and wood will be judged dollar-wise in relation to their capacity to duplicate the amount of power equivalent to Susitna's pipeline capacity.

Missing entirely from the study of alternatives is the human factor which has already confounded previous power demand projections by APA. Human reactions to the energy crisis have already diminished actual power needs of the Fairbanks area so much that GVEA has discarded plans for expanded power generation.

Conservation is given short shrift by APA in listing alternatives, and is assumed to be a mandatory function of government, enforcing low, medium or high intensity regulations. That conservation can be a spontaneous reaction initiated by Alaskan residents themselves escapes their notice.

The actual mix of alternatives geared to present-day energy costs is already evident. People are spending money on super-insulation of new or existing structures; they have turned off electric heating elements and installed [illegible] units to supply space heating, [illegible] they are utilizing solar energy, mostly passive, for many low-grade heating tasks, including heating water. Their homes are cooler and they don sweaters.

As is so often the case, this ongoing revolution in human habits and adaptations has escaped the notice of the "experts," intent only on their charts and graphs and the imperatives they visualize of industrialization and increasingly complex technologies. They ignore what is happening all around them. By the time they are ready to stage their party, to produce those gargantuan increments of electrical power, they may look around and discover that nobody really wants it.

However, that won't daunt them. When local demand fails to match the over-supply, they will unveil Scenario No. 2, and provide alluring inducements to attract industry north to use that power, and we'll be trapped in the same game of hard-selling surplus power, outstripping supply, and being forced to create more power which has been going on in the Pacific Northwest for years, until finally those unhappy citizens find themselves being billed to construct massive nuclear plants to supply the artificially created demands.

But these considerations won't fit into a computerized analysis.

Last of a series

4-11-80 Fairbanks

Take it from lawmakers . . . Susitna is a priority

Hydroelectric development on the Susitna River to help power Fairbanks, Anchorage and the areas between is being studied by state officials. This five-part series looks at the proposal.

By SUSAN FISHER
News-Miner Bureau

JUNEAU—Senate leaders are gung-ho, House members are reserved, and Alaska's congressmen are pushing for the state to take the lead on the Susitna River hydroelectric project.

The word among legislative leaders is that at least $7 million, and perhaps $10.8 million, is assured this session for phase-two studies of the project.

What is not assured, and in fact may be in dispute, is any funding this year for initial studies of an inter-tie, or power grid, connecting Anchorage, Fairbanks and the areas between.

And the House is reserving any full commitment to Susitna until it has the study results in hand and a full examination of alternatives.

Susitna hydro has not been a visible item this session, with the exception of one Senate Resource Committee meeting jammed with supporters.

But leaders in both the House and Senate confidently say there are a majority of votes to fund phase-two studies.

"There's no higher priority for the Railbelt, in my opinion," said Senate Minority Leader Jalmar Kerttula, D-Palmer. "The better it's understood, the less opposition I see."

He has pressed for $7 million in the Senate's capital supplemental budget if an appropriation bill for phase-two studies isn't passed. Another $3 million or $4 million could be put in the Senate budget.

On the House side, a bill packaging several hydro projects under the Alaska Power Authority is being drafted.

House Finance Chairman Russ Meekins Jr., D-Anchorage, said the Susitna study funding will appear in that bill, not in the budget or supplemental capital bills.

The $10.8 million for the Susitna studies would be financed by the five per cent oil royalty that now is set aside for renewable resources development, said an aide to Rep. Jim Duncan, D-Juneau. Meekins confirmed that.

Meekins also said Thursday that while the House as a whole will vote for the full Susitna study series, his committee has no money for the inter-tie study.

Sen. Majority Leader Mike Colletta, R-Anchorage, said he will press for at least $5 million this session to begin inter-tie studies.

The inter-tie is justified with or without the Susitna dams, Colletta said. It has "the potential of creating a lot of job activities at a time when jobs are needed, and consolidating the energy requirements for a vast area of the state," he said.

"Support for Susitna is solid in the senate," Colletta said. The inter-tie and Susitna, he believes, can fuel not only the Railbelt, but industry, including all petrochemical activity that could evolve from a gas liquids pipeline.

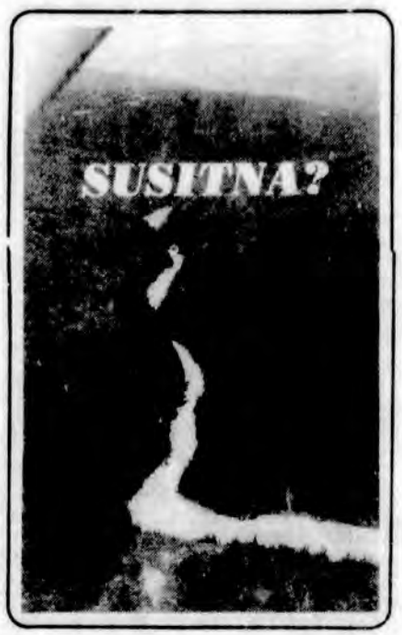
Susitna, says Senate Resource chairman Bill Sumner, R-Anchorage, "is a dream in the process of coming true for a lot of people," some of whom have supported the concept since the late 1960s.

"The state can't afford to wait much longer in terms of getting that project under way or we'll pay for it in the escalating cost of petroleum energy we're using now," Sumner said.

Anchorage, which now enjoys low-cost natural gas, is "within five years of seeing runaway costs in terms of gas prices. The replacement costs are going to be astronomical in terms of tax rates," Sumner predicts.

While no one believes Susitna hydropower could be on line before the early 1990s, Sumner, Colletta and

(See SUSITNA, page 8)



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Federal funds not expected

By SUSAN FISHER
News-Miner Bureau

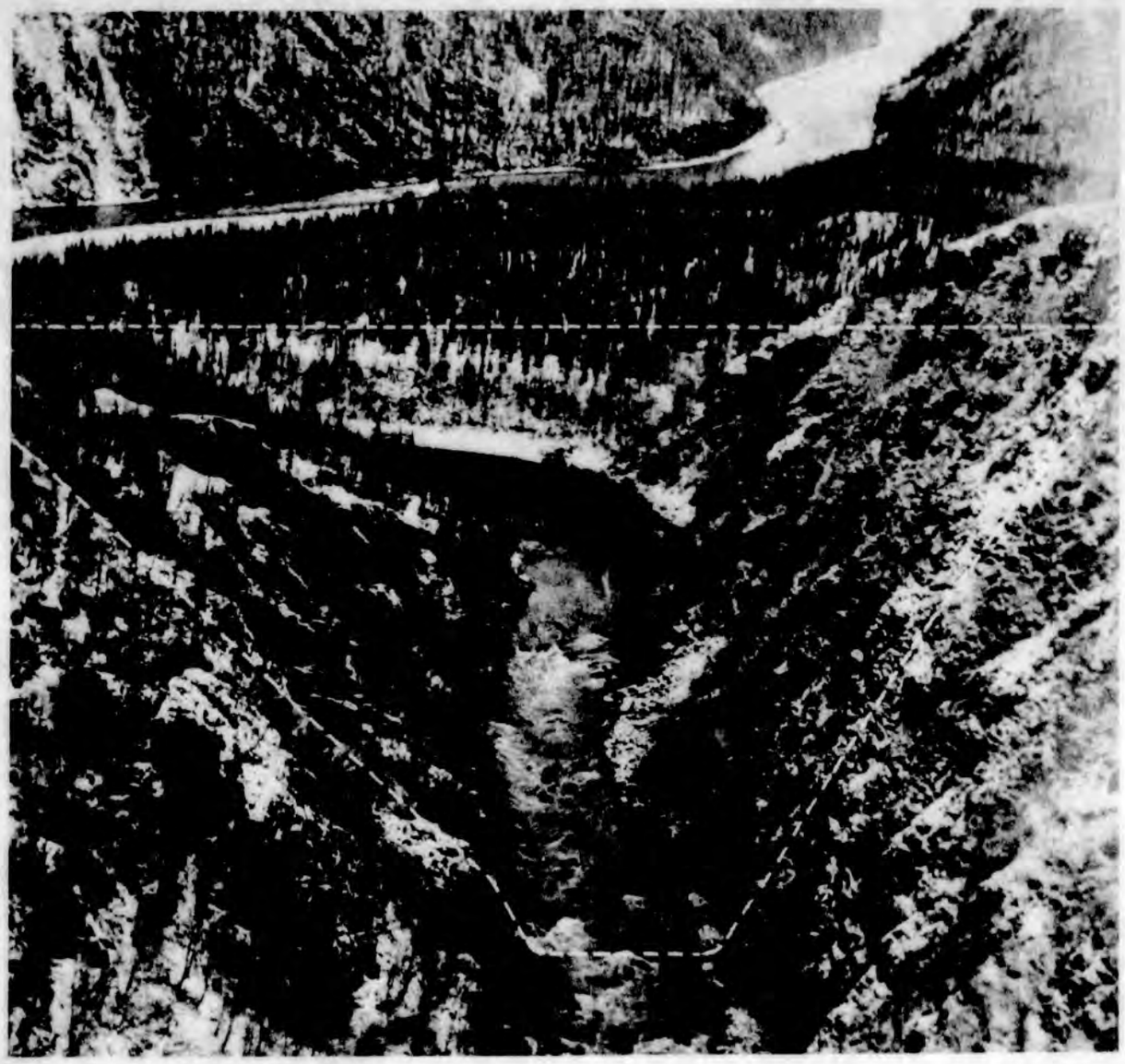
JUNEAU—Alaska's congressional delegation is united: the state should continue taking its own lead on the Susitna project even if it must do so without banking on federal bucks.

Republicans Rep. Don Young and Sen. Ted Stevens believe the federal money just won't be there for a project as large as Susitna.

Democrat Sen. Mike Gravel isn't going that far, saying there is a chance for federal funding, but there is no national bond market, anyway.

They believe the state is correct in going ahead with the studies at its own expense, and all said they will continue trying to line up federal funding.

(See CONGRESS, page 8)



PROPOSED DAM SITE—The Corps of Engineers' proposal for a hydroelectric project on the Susitna River includes an 800-foot thin-arch concrete dam at Devil Canyon. The dam would be built after the earth-fill Watana dam was completed upstream.

SUSITNA . . .

(Continued from page 1)

Kerttula see it as the long-term answer for the future.

But two House members caution that many of the fans on the Susitna bandwagon are oversimplifying the project and the results.

Reps. Brian Rogers, D-Fairbanks, and Hugh Malone, D-Kenai, comprise the House Power Alternative Study Committee.

Susitna may be feasible, but the information that studies must yet provide is detailed and complex, and by no means assures that the state will want to go with the original Army Corps of Engineers concept of two dams on the river.

Some of that needed information is core and rock samples, river flow, physical characteristics of the site, per-kilowatt cost, consumer demand, utility rate structure, the size of one or both dams, silt deposits, market and alternative energy mixes.

Rogers and Malone said it is premature to assume the state is now at the "go—no go" point of decision-making on the project as a whole; it is too early to decide.

Malone said that when the state goes to the Federal Energy Regulatory Commission for permits, it must show the alternatives and prove that Susitna is the best choice. That means a full study of the alternatives.

Such a study of small hydroelectric projects, solar, wind, biomass, wood, waste heat, conservation, and coal has been commissioned, but the results won't be in by the end of this session.

"I don't believe I have enough information to say Susitna is the answer, at least not until the studies are complete. I wholeheartedly support the studies," Rogers said.

Malone said a common assumption is that Susitna will provide cheap energy. Cheap, perhaps, in comparison to future oil prices, but not necessarily at rates lower than today's, he said.

If the dams or the inter-tie are over-designed, if the project has cost overruns, if alternatives aren't carefully examined, the consumer will pay, Malone said.

Alternatives come into sharper focus as a way to supply energy in the next decade or so before Susitna is on line, Rogers said.

Even if the state goes with Susitna, it must have back-up energy. Otherwise Alaskans, particularly Fairbanksans, truly will find themselves "freezing to death in the dark" in the event of a line failure or dam breakage, Rogers noted.

"People are not going to tolerate going without lights for three years waiting for Susitna; they just aren't going to wait," Malone said.

"With everything I've heard, in figures, the cost production of kilowatts has always been more than the Susitna," Kerttula said. "When it's on-stream, the full power needs of the area would take the first dam, with 200 to 500 years of firm power."

"I'm enamored with a completely renewable resource and one that I see no possibilities of desecration or evenvironmental damage," he said.

"If you didn't have Susitna, you may need that grid more than ever," he said, adding that "small hydros could double capacity."

But another issue that could net political debate is how the state will pay the full costs of the Susitna project if it is a "go."

Sumner and Kerttula maintain that a firm energy supply at a stable cost to the majority of Alaskans would benefit the bush, because the state can underwrite the kilowatt cost differences.

Rogers said a feeling among legislators whose districts would not benefit from Susitna or the inter-tie, particularly Southeastern legislators, is that the project should be revenue bonded, just as the smaller hydro projects, rather than paid for on a cash basis.

Some of the most enthusiastic support for Susitna is coming from municipal officials—borough assemblymen, city councilmen, mayors.

"Municipalities are acutely aware of the need," Sumner said. "They are fully aware of the escalating costs. They know that it's (Susitna) competitive with any tax dollars. Mat Valley knows to the extent development is feasible, they have got to have the power."

"I think people under-estimate the magnitude of the project," Malone says. "It will be one of the largest hydro projects on the North American continent. In anybody's book it's a multi-billion-dollar project."

He points to the Bradley Lake hydro project Army Corps of Engineers is working on in his district. Anchorage's municipal utility company put in a 75-megawatt gas-fired turbine for $7.5 million. Malone said Bradley Lake hydro, which will generate about 75 megawatts, is estimated to cost $200 million.

Of the House studies, "What we're really trying to do here in the long run is provide power at reasonable rates to the larger area with the best course of action," he said.

If hasty or wrong decisions are made, "The one who suffers in the end is the consumers, not the politicians," Malone said.

Dotting Ireland's countryside are some 150 ancient stone tombs. Exp... believe that revered dead were ... in such places. However, it ... unknown why the large s... weighing as much as a ... were moved and erec...

Second of a series

State financing could make or break hydro plan

Studies are under way for what could be massive hydroelectric development on the Susitna River. This five-part series looks at the proposal, its benefits and the objections.

By SUE LEWIS
Staff Writer

If the Susitna hydro project were built in 1980, state officials believe it would cost $3 billion.

But construction is years away and will take a decade to complete. Who will pay for it, where the money will come from, and when construction will begin are all open questions.

And the effects of inflation leave the actual cost an open question, too, since 1980 dollars may be worth far less further into this decade.

Early this year the state began a 30-month study, estimated to cost $26 million, to find out if the project is feasible. About this time next year the Alaska Power Authority expects to recommend whether the state should go ahead with license applications before the Federal Energy Regulatory Commission.

Originally proposed by the U.S. Army's Corps of Engineers, the project is now under APA's authority. State officials believe if state financing can't be arranged, the project probably will never be built.

"I really don't envision any Corps of Engineers involvement," said Eric Yould, executive director of APA. "We have to rely on the advice our congressional delegation has given: Susitna is so large and the mood in Congress is such that we probably couldn't get funding."

With that concern in mind, Sen. Mike Gravel, D-Alaska, in 1976 pushed through the Alaska Hydroelectric Power Development Act that enables the federal government to back state bonds to pay for the feasibility studies. If the project turns out not to be feasible, the federal government would reimburse the state.

It's up to the Legislature to decide how to finance construction. Gravel has said he believes the project would be an appropriate one for his proposed Alaska General Stock Ownership Corp. to participate in. Voters this fall will vote an initiative setting up AGSOC.

If the Corps had built the project, it would have been its largest in terms of cost. But other dams are substantially larger in size, according to Yould.

Watana, the first of two dams to be built under the present scheme, would be an earth-fill dam 810 feet high. Yould said it would require 50 million cubic yards of fill; Torbella Dam in Pakistan used 200 million cubic yards, he said.

He said the Russians are building a dam that reaches 1,300 feet high, compared to Watana's 810 feet and the 635-feet high concrete thin arch dam that would be built at Devil Canyon downstream from Watana. Canada's Mica Dam is about the same height as Watana and Hoover Dam is about the same height as Devil Canyon.

Earlier this year the contractor for the feasibility study, Boston engineering firm Acres American, set up a 40-man camp at the Watana site and began engineering and environmental studies.

Last week they submitted an application to the federal Bureau of Land Management for a permit to conduct environmental and hydrological studies at the two dam sites and in a corridor from the dam sites to the Railbelt area.

BLM spokesman Joette Storm said that although the application is for a permit for work from April 8 to December 1983, BLM is most likely to grant for a year at a time, each year reviewing work done the previous year before extending the permit.

That work will help state officials decide whether to recommend the project be built. If they decide to recommend construction, it will be up to the Legislature to decide how to fund it.

☆

Yould said cost estimates and feasibility studies now focus on the two-dam scheme proposed by the Corps of Engineers. But he said if the decision is made to proceed, that scheme will be compared with other engineering designs, and changes could be made.

The Corps estimated it would take six years to build the Watana Dam, which would go up first, along with the related transmaission lines to carry electricity to Anchorage and Fairbanks. That dam would provide 3.1 billion kilowatt hours of energy.

Then construction of the Devil Canyon dam would begin, taking five years to complete. It would add 3 billion kilowatt hours of energy.

Although the entire project would thus take 11 years to complete, Yould said power from the Watana Dam could be on line by 1990 if licensing and permit processes proceed smoothly.

He said if the state decides to proceed, it will ask the newly created Energy Mobilization Board to help unsnarl the red tape and get the project to construction as quickly as possible.

If plans for state financing fall

(See SUSITNA, page 3)

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Usibelli feels industry will step in next

By DERMOT COLE
Staff Writer

The Usibelli Coal Mine near Healy produces about 700,000 tons a year of coal to provide heat and light for Interior Alaska.

Mine President Joe Usibelli, whose customers include Golden Valley Electric Association, MUS, the University of Alaska and the military, believes that if the Susitna project is built, there will still be a demand for Healy coal because industry will move in to sap up the electricity produced by the dams.

"You've got that much power in one place, some kind of industry comes in, possibly aluminum, and you're right back where you started," Usibelli said.

He said Alaska needs an industrial base and perhaps the Susitna project should be considered an industrial power source.

Usibelli said he doesn't know if the project will ever be built and he questions whether it can pay for itself because he believes government-funded hydroelectric projects never do. But Usibelli said there still would be a need for coal-generated power if Susitna is built.

"I'm highly prejudiced, but I think that coal is an alternative that should be looked at very thoroughly," he said.

"Alaska has as much coal as the rest of the country ever had. At our current rates of production we've got enough for 300 years. The dam will certainly be full before then and coal would disturb less ground in the process."

While Usibelli believes Susitna power could be the kickoff for industrial development, others say the normal growth of demand for electricity will absorb whatever it has to offer, which currently is about twice the annual electrical consumption in the Anchorage, Kenai and Fairbanks areas.

In an attempt to settle some of the questions about the demand for Susitna

(See HEALY, page 3)

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(Continued from page 1)

er and the alternatives open to the te, the University of Alaska's In- itute of Social and Economic esearch has been hired to do a power- demand study as part of the Susitna feasibility studies.

Assistant professor Scott Goldsmith said there are two factors that make such predictions difficult. The first is accurately projecting the rate of economic growth, which he said is the "driving force" behind electrical demands. The second is determining what the energy alternatives are.

"You can't really say just on the basis of demand alone. You have to look at what the other sources of supply will be at that time," Goldsmith said.

Predictions of Alaska's economic growth and demand for energy have tended to less accurate than in other western states, Goldsmith said, because of the boom-bust nat re of the economy.

A recent borough study comp ared the accuracy of population projections to predictions of electrical demand.

The borough said a 1974 study by the Alaska Power Administration predicted a three per cent annual increase in the state's population, bringing the population to 410,000 in 1980.

The actual rate is close to that projection, the borough said. It's a different story with regard to electrical demand projections, which the Fairbanks Energy Inventory said were "about twice as high as actual consumption" in 1978.

HEALY . . .

(Continued from page 1)

through, it could be decades before Congress approves money for the Corps to build the project. Gravel cites projects in other states—some with influential congressmen—that took 34 years, 26 years, and 40 years to complete after Congress authorized them.

"It has taken an average of 18 years from the time of authorization to first construction monies," he has said.

For Wednesday: The environmental questions.

SUSITNA . . .

(Continued from page 1)

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For Wednesday: The environmental questions.

Associated Press

OOL'S OUT TODAY

face from embers and smoke as he surveys the remains of the school which had no fire protection.

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will be trying to give the middle ground," Parenteau

binson then denies the fed-ernment's request for a stay, have prevented the govern-m accepting the bids, forc-nterior Department to can-sale and return $100,000 in yments on bids.

government is successful in st for a stay, Interior Secre-il Andrus will go ahead and award the leases. However, the leases might eventually be voided, if an appeals court upholds the permanent injunction.

Saying "a clock is ticking away," Margaret Strand, lead attorney for the Justice Department, told the judge that "the sale would be effectively canceled" if he did not permit the stay.

However, attorneys for the environmentalists and the natives argued that approval of the bids constitutes a commitment to continue with the lease sale.

Bruce Terris, attorney for the North Slope Borough, said: "The acceptance of bids constitutes an obvious commitment to the lease sale as it now stands. This court said it would not consummate the lease sale and it would not accept the bids."

Terris also raised anew the bids offered on the four Dinkum Sands tracts, subject of an ownership dispute between the state and federal governments.

"This is urgent," Terris said. "They (the oil companies) are going to start with pre-exploration work on Dinkum Sands — the very action the court enjoined."

But state attorney Robert Loef-

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pressure in the Gulf of pressed against a high pres-r Nome brought high winds Anchorage, Kodiak, Valdez r areas of the north gulf

to 60 mph were recorded in while 45 to 55 mph winds

Electrical exports linked to fish kill

Associated Press

Vancouver, British Columbia — British Columbia Hydro's electricity exports to the United States were linked Tuesday with possible destruction of salmon-spawning beds in the Nechako River in the northcentral part of the province.

Hydro officials testifying at the National Energy Board's hearing into Hydro's bid to renew four export licences said at least some of the electricity purchased from Alcan Aluminum Ltd.'s Kemano generating station will be used for exports to the U.S.

Under terms of a contract drawn up a year ago, Hydro can purchase a minimum of 1,200 gigawatt hours a year from the Kemano generating station at the Nechako Reservoir. One gigawatt is one billion watts.

In fact, in 1979 hydro purchased 1,700 gigawatt hours from Kemano, according to testimony by W. N. Tivy, hydro's superintendent of systems control.

In previous testimony Bill Best, vice president of electrical operations for Hydro, confirmed the power from Kemano makes up part of the load used by Hydro for interruptible exports to the U.S.

Bill Schouwenberg, chief of the water use unit of the fisheries habitat protection branch, told the energy board reduced water flow into the Nechako River from the Kemano dam this fall may have damaged spawning areas downstream for chinook salmon.

He testified that low water levels could expose some of the spawning beds and freeze the salmon eggs.

Schouwenberg said he won't know for sure how much damage has been done for another four or five years, when the hatched salmon return to spawn.

But he suggested a seriously reduced salmon population could cost the province's fishing industry hundreds of thousands of dollars.

Schouwenberg said Alcan spilled off large volumes of water from the Kemano reservoir last summer, but drastically reduced those volumes in the fall when they were needed to keep river levels high enough for the salmon beds.

The problem was compounded by the company refused.

He predicted that if there is substantial damage to the spawning beds in the Nechako River, fishing restrictions will be needed in four or five years to make sure enough spawning chinook salmon get back into the rivers.

Best said he was unaware of the problem with the Nechako River, and pointed out that Hydro has no control over how Alcan runs its dam and reservoir.

Panel OKs zone plan

(Continued From Page A-1)

Spencer, chief administrative officer for municipal utilities.

The assembly's decision doesn't affect Chugach State Park. It remains designated as public lands and for all practical purposes can't be developed.

In other business Tuesday, the assembly:

— Withheld the appointment of Doyle Carmody to the Planning and Zoning Commission. Several assembly members expressed concern that there may be too many persons involved in real estate serving on the commission.

Carmody, who has been active in all phases of real estate in Alaska, will be asked to appear before the assembly next week.

While the assembly withheld approval of Carmody, it did approve the appointment of more than 50 persons to various city commissions and boards.

— Scheduled a work session for next week to discuss a proposed increase in the sewer rates charged in the Anchorage bowl. The work session was asked by Rose, who has charged that the rate hike is illegal because it represents "de facto" consolidation of the Eagle River, Girdwood and Anchorage sewer service districts.

— Said it wants to meet with the Anchorage School Board to discuss the closing of Russian Jack Elementary School and other recent actions

Sourdough Jack Sez: "Jimmy severed diplomatic relations with Iran? That means he'll recall our Embassy employees from Tehran. Clever way to outsmart those militants!"

Energy, which provides an incentive for producers to hoard North Slope oil.

The scheme is called the entitlements program. It was originally created to force producer-processors with large reservoirs of cheap domestic oil, to foot part of the bill that small and independent refiners paid for imported and Alaskan crude.

Now, according to Ashland Oil Pesident Robert E. Yancey, the program is perpetuating the very thing it was set up to prevent: harm to small and independent refiners.

Not only is it channeling $180 million a month out of the pockets of independents and into the coffers of

received $2.84 million in additional receipts between July and November.

"Our average crude costs would have been reduced by 50 to 60 cents per barrel," Yancey wrote.

And, a spokesman for the Independent Refiners Association pointed out, independent refiners would not be in the position they now find themselves: scrounging for the Alaskan crude like thirsty men roaming the desert for water.

Only a year ago the entitlements program, which was started at the time of the Arab oil embargo in 1974, made sense to everyone.

Alaskan crude was cheap, but

their oil because that was what
gn crude cost.
view of the large transportation
s and small profits on Alaskan oil,
rgy officials decided to treat it the
e way they treated imported oil.
finers who processed either were, in
ct, subsidized.
hen it was introduced and for five
rs later, the subsidy had little effect
the market for Alaskan crude.
roducers scrambled for purchasers
Alaskan crude on the West Coast
ther than having to ship the oil
ough the Panama Canal to Gulf of
exico refineries.
nd independent refiners on the West

domestic oil.

These days, a barrel of foreign crude delivered to the Gulf Coast costs about $30. Alaskan producers can beat that price even if their shipping cost is $9 a barrel, because federal controls limit their wellhead price to $14.

Prudhoe Bay producer-processors now can make a hefty profit by selling their oil to West and Gulf Coast refiners. But they can make an even greater profit by refining it themselves. DOE's entitlements program still subsidizes them to do just that.

"Through last November, producers paid 65 cents per barrel of Alaskan

domestic oil is decontrolled.

"In a couple of months, you won't have the entitlements program to kick around," joshed an official from Arco.

Meanwhile, as thirsty independents look on, the producer-processors are refining more and more of their Alaskan oil.

Sohio, which owns 53 per cent of the 1.5 million barrels that now go through the pipeline daily, refines more than half of that amount itself, or 450,000 barrels.

Exxon owns 300,000 barrels of the daily ouput. According to sources

Pinched by the majo
independents also are b
by their own foresight
management.

In the past year, West Co
have adapted their plants
greater amounts of Alas
Whereas last spring, they
handle about 800,000 barrels
they can consume as much
barrels daily.

Industry officials postulat
Coast refiners could proces
200,000 barrels of Alaskan c

(See OIL, page 5)

First of a series

4/7/80

Devil Canyon could be Alaska's Hoover Da

Studies are under way for what could be massive hydroelectric development on the Susitna River. This five-part series looks at the proposal, its benefits and the objections.

By SUE LEWIS
Staff Writer

If Hoover Dam were spanning the Susitna River at Devil Canyon, it would look a lot like the dam that may be built there sometime during this decade.

Devil Canyon is one of the two sites on the Susitna that the Alaska Power Authority is studying for a two-dam hydroelectric power generation system.

Although a hydro project on the Susitna River has been on the drawing board for years, it will be at least another year before state officials decide whether they'll recommend it be built.

"Hoover Dam's height will give people a feel for what Devil Canyon will look like," says Eric Yould, executive director of the Alaska Power Authority. "Hoover is just over 700 feet high and Devil Canyon would be 635. They're both concrete, thin-arch dams."

The project itself and methods to pay for its construction have changed substantially since the U.S. Army Corps of Engineers in 1950 listed three sites along the Susitna for "possible future developments."

When Congress that year asked for a preliminary examination and survey of harbors and rivers in Alaska, and for a report on the advisablity of improvements in the interest of navigation, flood control, hydro power, and related water uses, the Corps listed the Watana, Denali and Portage areas on the Susitna River as possible sites for hydroelectric projects.

The Portage site, since renamed Devil Canyon, remains as one of the sites for a two-dam proposal the Corps of Engineers pursued in the 1970s, and still gives its name to the entire project, now estimated to cost some $3 billion in 1980 dollars.

Now overseeing the entire project is the Alaska Power Authority, a body created after Sen. Mike Gravel, D-Alaska, pushed through Congress the Alaska Power Development Act of 1976.

According to Gravel, the Susitna project would have been considered years earlier if two other events hadn't intervened.

"The first was the abortive Rampart Dam proposal," Gravel said in a May 23, 1977, report. "Sen. Ernest Gruening, who held the same position I now hold

on the Public Works Committee, proposed, with the Army Corps of Engineers, a huge dam at the Yukon's Rampart Canyon 100 miles northwest of Fairbanks. A heated national debate

a ise over the environmental liabilities o the Rampart proposal, and a subse uent cost benefit analysis showed th project to be economically undesirable."

Gravel said the Rampart proposal was dismissed just as a second water crisis occurred: the 1967 flood at Fairbanks.

"For the next several years, the need for flood control drew attention away from the question of hydroelectric development in the state."

But in 1972 the Senate Public Works committee ordered the Corps of Engineers to renew the study of power options, including hydro potential, for the Railbelt. And in 1973 Gravel became chairman of the Water Resources subcommittee. From that position, he pushed for funding to study the project.

"Its locations, its high power potential, the stabilizing effect it could have on the energy systems of the Railbelt area and the fact that it would reduce the need for new fossil fuel plants in Alaska—all these factors were in its favor," Gravel said in 1977.

And besides, he pointed out then, "environmentalists had cited it during the Rampart controversy as a preferable alternative because it would do relatively little harm to fish and wildlife habitat."

But after deciding the project might never be built if left under the Corps, Gravel pushed for passage of the Alaska Power Development Act, allowing the state to pay for feasibility studies, with a federal repayment guarantee if it turns out the project is not feasible.

This year the state began a massive study to find out if construction is feasible. A 30-month study, funded by $26 million from the state's general fund, is to look at power demands, the site itself; the river's hydrology; the geology of the area; fish, wildlife and plants in the area; and marketing and financing.

A Boston engineering firm, Acres American, is conducting the study, and this spring set up a 40-man camp at the Watana Dam site, the first of the two dams that would be built.

After the results of the first 12 to 15 months of study are reviewed, Alaska Power Authority officials will recommend whether to proceed with the next step: getting permits and licenses from the Federal Energy Regulatory Commission.

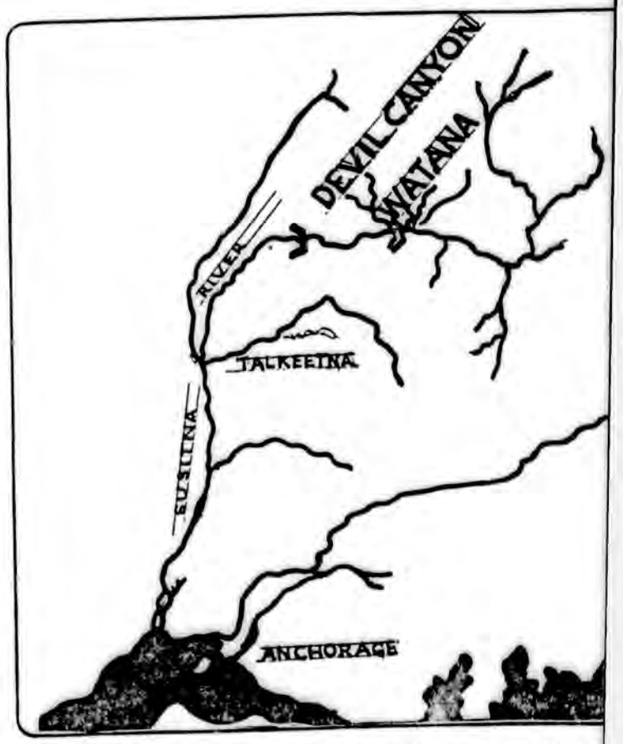
According to APA's Yould, about this time next year the power authority will look at load projections being developed now and at preliminary environmental assessments, then decide whether to recommend proceeding to the license phase.

"Assuming Susitna has been found to be superior to the alternatives, both economically and environmentally,

we'll recommend to the g
the Legislature that Susitn
proceed to FERC licensing.

Yould said the economic
would be made by assign
alternative power generati
then comparing them to Sus

(See SUSITNA, pa



HYDROELECTRIC PROJECT—The state is construction of a two-dam hydroelectric proje Susitna River, shown in this map. The project clude an earth-fill dam at Watana and a concre Devil Canyon. (N

Fairbanksans' utility rates could rise after hydro completion

By DERMOT COLE
Staff Writer

Electric rates in Fairbanks won't necessarily go down if the Susitna hydro project is built, but utility bills would level off once electricity from the two proposed dams on the Susitna river flows to the state's largest cities, supporters of the project claim.

"In many respects Susitna could be expensive in the initial years of operation, but over the long, long, long run, it's going to be extremely cheap power," said Eric Yould, executive director of the Alaska Power Authority.

He said it's conceivable utility rates would go up with completion of the first of the two proposed dams in 1990 or so—it depends on the interest rate and the ulitmate cost of the two dams, now estimated at $3 billion.

"The interest rate on a capital-intensive project is very critical to what the ulitmate cost of energy is to a community," he said.

"If we were to go to revenue bonds on this project we might be able to get 7 per cent money. If, on the other hand, the state wanted to make a total equity investment in the project, they could virtually control what the cost of power would be by the interest rate," Yould said.

In any case, Susitna boosters say that once the project is finished, the cost of the electricity it produces won't be subject to the inflationary pressures afflicting power plants fired by oil or coal.

One who subscribes to that idea is Bob Hufman, general manager of Golden Valley Electric Association. About 25 per cent of Susitna's power would be consumed in the Fairbanks area. The rest would go to Anchorage.

"The electric rates would be less from that hydroelectric development than it would be from a coal-fired unit, and about the only thing close to it would be a very large nuclear facility used by both Southcentral and the Interior," Hufman said.

He said GVEA probably would continue to run its coal plant in Healy

(See ELECTRIC, page 5)

ELECTRIC . .

(Con tinued from page 1)

after the Susitna dams are brought into production and the utility would shut its other, more expensive oil-fired generators, keeping them in reserve in case of a failure in the transmission line.

The cost to the Fairbanks consumer of Susitna power probably would be more than today's rates, but lower than the cost of future alternatives, according to Chuck Behlke, former dean of engineering at the University of Alaska and a member of the Alaska Power Authority's board of directors.

But Behlke says no one will be able to say anything definite about the cost of Susitna's power or the demands for it until the state completes a 2½-year fact-finding effort now in its early stages.

"At this point I think it's very possibly a good idea," Behlke said of the Susitna project. "But I don't feel we're doing $26 million worth of studies to prove a point that I or others have already arrived at."

He said he personally does not want to promote a power project that will attract a "dirty industry" such as steel or aluminum to Alaska by making large amounts of excess electricity available.

Environmentalists fear the Susitna project will bring on just such an industrial influx and it's one of the arguments they use against the project.

In addition, environmental critics say the proponents of Susitna view an ever-expanding future for energy consumption, while they believe more emphasis should be placed on conservation and methods of reducing energy waste.

The Fairbanks Environmental Center says construction costs for Susitna are estimated at between $4.2 billion and $6 billion.

The center also says the project is founded on "questionable assumptions," such as a prediction that the population and the per capita consumption of energy will double or triple in the next 15 years and energy consumption in the Railbelt will increase by four to 10 times.

But Yould says electric consumption in the Railbelt now is equal to about half of what Susitna could provide and that over the coming decades, the demand will grow to the point where the full capacity of both dams would be needed.

SUSITNA . . .

(Continued from page 1)

If the state follows the scheme proposed by the Corps of Engineers, it would first build the Wanata dam, an earth-fill dam 810 feet high. Then the Devil Canyon dam downstream would be built, plus transmission lines to Anchorage and Fairbanks.

The Corps has estimated it would take six years to build the Watana dam. It would provide 3.1 billion kilowatt hours of energy. Devil Canyon would take five years to build, providing an additional 3 billion kilowatt hours of energy.

About 75 per cent of the energy would be consumed by the Anchorage area and the rest by the Fairbanks area.

For Tuesday: Who needs it? What would it cost?

"Flying is the one of the reasons I came here in the first place," said Thomas, whose flying abililities are well documented. "I've always been something of a bush pilot."

Thomas said he expects to work as a contract air carrier during the summer, servicing climbing groups booked by Genet Expeditions.

"I perceived a real need for this

His one-man, one-plane operation will consist of himself and a Helio-Courier equipped with a single 295 horse power engine. The plane is highly rated as one of the best short takeoff and landing planes made. Its design was perfected in the 40s by a group of Massachusetts Institute of Technology engineers.

Thomas, who is an old hand at fly-

vice, but will be able to respond instantly if needed by the climbers.

"I think the service will be permanent, but I will take it one summer at a time," he said.

Thomas was Gov. Jay Hammond's running mate in 1974 but did not seek re-election in 1978. He lives in Anchorage.

ping to a furnace replacement burner designed for better fuel efficiency.

If the improvements could be demonstrated to pay for themselves through energy cost savings over a seven-year period, persons could receive grants for their purchase, construction or installation. Grants

4/23/80

Consultant criticizes Susitna dam study

by Mark Skok
Times Writer

The Susitna dam project may be unfeasible and definitely would not begin providing electricity until the 1990s, a time of declining power needs in Alaska, says a consultant's report released Tuesday.

And an earlier study of the Susitna project is weak and appears aimed at selling the project rather than electricity, according to the report by Arlon R. Tussing & Associates Inc.

Tussing's report stems from a $200,000 appropriation to the House power alternatives study committee.

Its strongly worded criticism is aimed at the preliminary Susitna Hydroelectric Project Plan of Study by Acres American Inc.

That consulting firm was hired by the Alaska Power Authority to examine the feasibility of Susitna power proposals.

"We believe the plan still needs major changes before it can remotely be considered as the basis for an informed state decision on the Susitna project," Tussing writes.

The preliminary Acres study was published in February. Overall, the $25 million Acres study plan is expected to take 30 months to complete.

The Acres study will not begin making even preliminary cost and scheduling estimates for the Susitna project until five weeks after the go/no-go decision is scheduled, Tussing says.

Nor can the Acres study compare alternative power sources with the proposed Susitna project in terms of cost, how soon electricity can be generated, and whether backup power will be available because no specific construction plan has been selected, he says.

It does not take a realistic look at power demands, according to Tussing.

Tussing foresees a power demand growth during the 1980s as Prudhoe Bay activity increases, but the demand will fall sharply during the 1990s as North Slope oil production declines.

Susitna power would not come on line until the 1990s.

The hydroelectric power is expected to be more expensive, at least initially, than power derived from coal or natural gas.

Chugach Electric Association, the largest utility along the railbelt, has not been an enthusiastic backer of the project, and Chugach management is not convinced Susitna power would provide the lowest cost or most practical way of serving its customers, Tussing says.

He does not expect the dam to be a major factor in attracting energy-intensive industry.

Abundant Susitna power conceivably could be a major factor in attracting only two energy-intensive industries, Tussing says. These are uranium enrichment and aluminum smelting plants.

The prospect of a uranium-enrichment plant being installed before 2000 is almost nil, the report says.

Factors other than the cost of electricity would be primary considerations in attracting an aluminum producer. The availability of ore, and shipping, construction and labor costs would affect strongly an industrialist's decision to build in Alaska.

He said power supply planners should include new energy-intensive industries in their forecasts only if firms sign a minimum-bill contract to purchase a definite part of the plant's capacity.

A 1974 power proposal by an aluminum manufacturer appears to have no active support now, Tussing notes.

Power transmission is a major problem in Alaska. Areas such as the Kenai Peninsula are subject to long power outages when wind and avalanches down lines.

Local power generating concepts, such as a smaller hydro plant considered at Bradley Lake 26 miles northeast of Homer, likely would suit the economic and power needs of peninsula residents better than the Susitna dam, according to Tussing.

Alaska Railroad raises fares

Associated Press

Fairbanks — The Alaska Railroad has announced it will hike passenger fares for its Fairbanks-Anchorage run about 25 percent as of May 1.

The one-way fare from Fairbanks to Anchorage will increase from $40 to $49.75 and a round trip ticket will jump from $72 to $89.75.

The railroad said it needed a rate hike because fuel costs have risen 112 percent hike since March.

No shortages seen of gas, oil

Associated Press

For the near future, Anchorage will probably have adequate supplies of gas and oil, although prices are expected to go up.

An Anchorage planning report said, however, that population growth or interruptions of supply due to gas line construction could bring shortages of gasoline and diesel fuel. The possible shortfalls could be as much as 25 percent below normal.

The forecasts were made in a draft report of an "Energy Crisis Contingency Plan" for the municipality.

Property taxes for most Anchorage homeowners will be lower than last year under 1980 mill rates recommended by Mayor George Sullivan Friday.

"Although the areawide assessed valuation for 1980 has increased by $7 million over 1979 figures, these lower mill levies will result, on the average, in lower taxes for property owners," Sullivan said.

(See chart, Page A-3)

The mayor's recommendation, which goes to the Anchorage Assembly Tuesday night, calls for lower mill levies in all 13 city tax districts. In nine of those districts, that means reductions in the average tax bill. In the other four, the mill levy reduction is offset by higher assessments and the average tax bill will rise slightly.

The recommended rates will be the subject of a 7:30 p.m. public

Sullivan gave three reasons for the lower rates.

He said the city received an additional $1.6 million in interest on short-term investments for 1980 because of high interest rates on today's money markets.

The municipality also is applying an additional $1.5 million of fund balance to the budget, bringing the total amount of fund balance to $9.3 million.

Additionally, the city received an increase of $15.8 million in state funds for the Anchorage School District. Anchorage School District tax requirements are down some $1.27 million for 1980 over the 1979 level, the mayor said.

As a result, Sullivan said total property tax requirements for the municipality will be $1.5 million less in 1980 than in 1979. Tax requirements for general government operations will be $51 million in 1980, which is a $239,400 decrease from 1979 tax requirements.

As an example of lower tax bills, Sullivan said the value of an $80,000 home in Muldoon increased by an av-

ever, the property owner will pay about $63 less in taxes in 1980 than in 1979.

An Anchorage Bowl home assessed at $80,000 in 1979 will require an average of $80 less in property taxes this year. A similar home in Eagle River, where the assessed valuations rose by 12 percent this year, will result in an average of $105 less in taxes under Sullivan's mill levy recommendation.

However, parts of the Anchorage Bowl and Spenard areas which were physically reappraised this year for the first time in three years will experience an average tax increase of $17.

our position towthem."

In their statement broadcast on Tehran radio, the militants continued "We have decided to keep the hostages in custody in various cities throughout the country ... At present, as a political act, the spy hostages are being kept in various places. Details of this decision will subsequently be disclosed to the nation."

The militants were quoted as saying they had information the American mission had a greater purpose than simply to rescue the hostages, and urged that the house of Iranian leader Ayatollah Ruhollah Khomeini

ies through diplomatic channels. Switzerland is representing the United States in Iran following President Carter's break in diplomatic ties on April 7.

Mrs. Timm, mother of 20-year-old Kevin Hermening, the youngest hostage, had been sitting at the back of the news conference but then moved forward and slipped into a seat beside Bani-Sadr before making her brief statement.

She said she clearly did not agree with the American move and that she expected to leave Iran on Sunday with her husband Kenneth. Mrs. Timm saw her son on Monday after arriving in Tehran 10 days ago.

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The drums of war heard in Anchorag

by Mark Skok
Times Writer

We're gonna rock you Ayatollah,
Sock you Ayatollah,
Bomb, bomb, bomb Iran ...

Since Friday evening, for 2 minutes, 11 seconds at a shot, listeners of an Anchorage radio station have been venting their frustrations over Iran to the tune of machine guns and explosions, set to Beach Boys music.

The song, first aired at 5 p.m. Friday on KFQD, is "Bomb Iran." If listeners initially mistake it for the old hit "Barbara Ann," the similarity is intentional.

Went to Iran
Lookin' for the man,
Met the Ayatollah.
Bomb, bomb, bomb Iran ...

When the song is pla
bombard the station w
ing where they can g
copies, disc jockey Bill
this morning.

KFQD, however,
copy. It was recorded
studio Friday by the N
This Time Zone Singer
widely known in the U
chorage for that matter

The Time Zone Sing
KFQD Station Manage
and the station's co
Ernie Norris, who moo

(See DRUMS, Pa

Financiers consider $1.6 billion Beluga fuel plant

by Susan Andrews
Times Writer

The Cook Inlet Region native corporation and a California mining corporation are considering building a $1.6 billion plant to convert coal at Beluga to methanol.

Cook Inlet Region Inc., and Placer Amex have asked the U.S. Department of Energy to finance a $3.8 million feasibility study of the proposal. Placer Amex is principal leaseholder on state-owned lands at Beluga.

The complex would use a process followed in conversion plants around the world to turn Alaskan coal into a usuable, clean-burning methanol fuel. The liquid could be used to power automobiles and other vehicles, as well as electric power generating plants on the West Coast.

Announced Friday, the Energy Department application was made in response to a request by the federal agency for test projects to see whether technology exists for production of synthetic fuels. The objective is to reduce the nation's dependence on foreign oil.

The process would require an estimated 20,000 tons of coal a day to produce 54,000 barrels of methanol. Proponents say that production level would reduce U.S. oil imports by about 14 million barrels of oil a year.

The test project at Beluga has the support of Gov. Jay Hammond, who said in a letter to Energy Secretary Charles Duncan that the project "clearly meets the Congressional intent" and demonstrates the growing importance of Alaska as a major energy supplier to the Lower 48 states.

Roy Huhndorf, president of Cook Inlet Region, said in a prepared statement that current studies give insight into the potential of the Beluga lands.

"We hope that a federal award as part of the synfuels program would demonstrate a way in which this important national resource can be developed for the benefit of our shareholders and other citizens of Alaska, while addressing the critical energy needs of the West Coast."

Placer Amex has been exploring and conducting engineering work on its Beluga coal leases for more than 10 years, according to Alan G. Horton, president of the firm.

He said the work shows the Beluga field contains in excess of one billion tons of low-sulfur subbituminous coal, which can be mined by surface methods.

Huhndorf said the proven coal reserves have the advantage of lying close to Cook Inlet, where there is a plentiful water supply in addition to an existing pipeline and tanker transport system.

"Many of the potential hurdles to development have been cleared," he said, "because the proposed project lands are held primarily by our corporation and the state of Alaska."

The plan is to use pre-constructed modules, delivered to the site by ocean-going barges from the Pacific Northwest, he said.

"Good environmental and construction conditions, strong public support and the existing product transport system are all factors which will support project feasibility," Huhndorf said.

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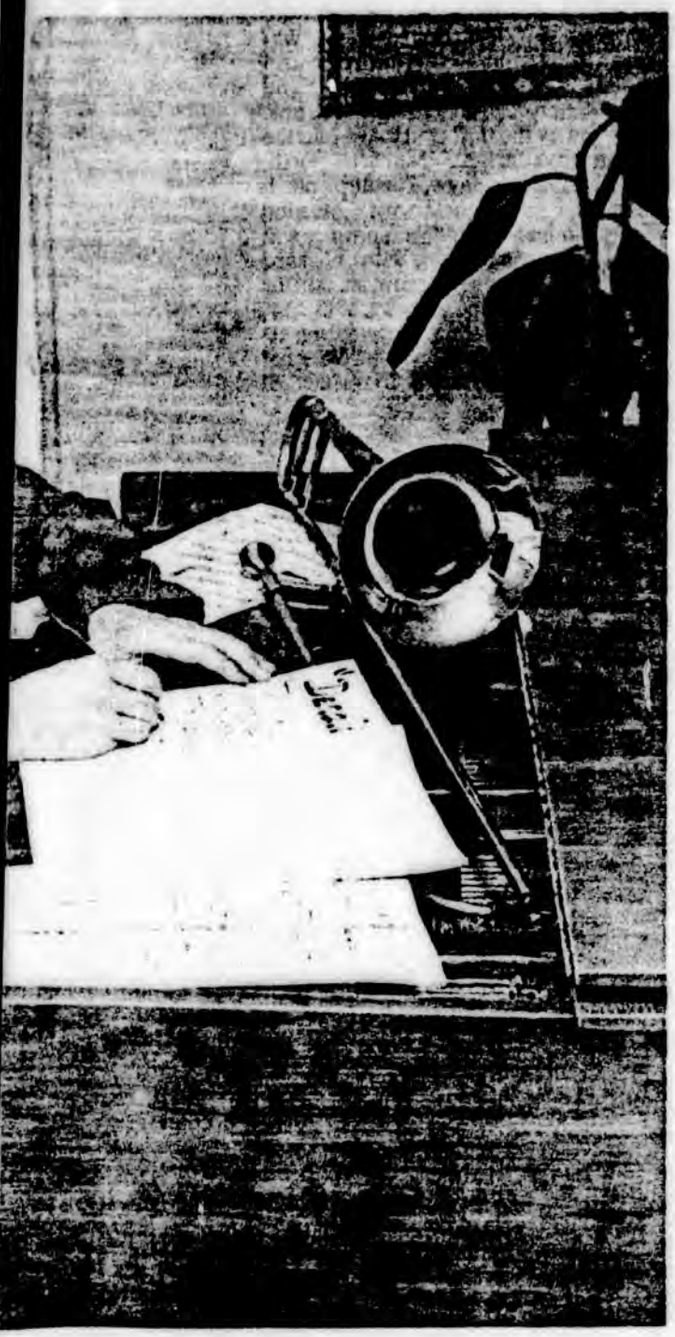
4/21

MONDAY, APRIL 21, 1980 30¢ Per Copy in Fairbanks 20 Pages



ist on lls 30, of gh schools today. Madden and six jazz musician colleagues known as "Jazz x Seven," will perform "Denali" at the festival's final concert Saturday at 8:15 p.m. at Hering Auditorium. See page 7 for a related story. *(Photo by Harding-Glidden Inc., of Boston)*

Susitna study said to need 'overhaul'

By SUSAN FISHER
News-Miner Bureau

JUNEAU—A special consultant's report says the Acres American Inc. study plan of Susitna hydropower needs a "major overhaul" if it is to be the base for deciding whether to go ahead with the project.

The draft report by Arlon Tussing and Associates Inc. was handed late last week to Reps. Hugh Malone, D-Kenai, and Brian Rogers, D-Fairbanks.

Malone and Rogers, members of the House Power Alternatives Study Committee, hired the Tussing firm to analyze Acres' study plan.

Tussing's report says Acres' plan of study for Susitna, released in February, "still needs major changes before it can remotely be considered" the basis for an informed state decision on the project.

Study costs alone are pegged at $29 million, but $16 million of that would not be spent until after a power alternatives report is finished. That "cannot help but be a powerful incentive for the study team to arrive at a favorable conclusion" to recommend Susitna, Tussing's report says.

"As it approaches construction, the Susitna project will become more rather than less controversial. If the project is indeed the best alternative for the Railbelt, an inadequate information-base or patently biased decision-making process will not make the project any easier to sell," Tussing's repoert says.

"If the project is not sound, we ought to find out earlier rather than later. Thus, the current study plan requires a major overhaul," it continues.

The Tussing firm recommends strengthening the study in eight areas, among them operating a state-of-the-art power planning model, and continued re-evaluation of early assumptions about the project.

"The current study plan's treatment of economic, financial and institutional issues is consistently superficial, and nowhere does it provide the funding necessary for timely and professionally competent demand forecasts, cost and risk analyses, or studies of marketing and rate design, reliability and load management, or financial feasibility."

"Acres seems to treat these issues (if at all) only as afterthoughts or window-dressing," the Tussing report says.

Tussing's consultants take a premise that Alaska will enjoy an economic boom in this decade because of the gas line and potential petrochemical industries.

But the Tussing report says that unless a major petrochemical industry is built, there probably will be an economic decline by the early 1990s, when Susitna could go on line.

Buildings constructed before the end of this decade will continue to be built with oil or gas heat, the report predicts.

Tussing's firm discounts cheap energy as highly speculative in terms of attracting new industry.

Even with a major power source such as Susitna, higher costs to build in Alaska would mean that a plant would have to face energy costs Outside equal to at least 60 per cent of its fixed capital costs "before even 'free' energy in Alaska would offset" construction cost handicaps.

About the only industry that would meet the criteria of benefits would be aluminum refining, the report states.

Power "demand forecasts are notoriously inaccurate," the report claims. Other "uncertainties" are cost overruns in construction, delays in completion, the rate fuel costs rise and the great number of federal permits and licenses needed.

"Traditional sources of direct and third-party guaranteed loans to Alaska utilities are drying up," the report says.

It discusses various financing

(See SUSITNA, page 3)

e convention

man. Holm is a George r.

chosen national com- animously.

gates spent most of tug-of-war to see which of nventions held in Seward present District 5.

credentials committee had been conducted in ith party rules. The state ted to seat a five-member ing Reagan over a Reagan and his Moral Majority gang." But other political leaders, including Gov. Jay Hammond, welcomed the newcomers to the political arena.

Prevo said he had asked Moral Majority members to be patient with party regulars, as well as to pay attention to them because they could learn from their experience.

Meanwhile, former Gov. Keith Miller said he is considering running for the Republican nomination to the U.S. Senate. Miller said he would announce

th Daily Newspaper"

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(See SUSITNA, page 3)

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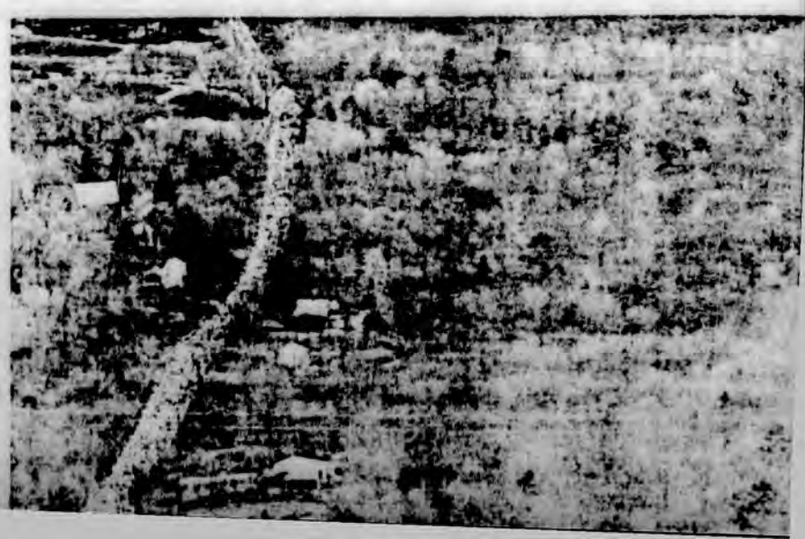
Reagan and his Moral Majority gang." But other political leaders, including Gov. Jay Hammond, welcomed the newcomers to the political arena.

Prevo said he had asked Moral Majority members to be patient with party regulars, as well as to pay attention to them because they could learn from their experience.

Meanwhile, former Gov. Keith Miller said he is considering running for the Republican nomination to the U.S. Senate. Miller said he would announce his decision within three weeks.

He would be the sixth Republican to



...Egypt supply the ...country with half of its oil. Israel must extract the rest from the erratic ...to ex- ...The Export Administration Act, which passed Congress this fall, forbids exporting North Slope oil.

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But the president would have to justify his decision to Congress, which would have veto power over it.

In May, a U.S. delegation will visit Israel to discuss the question of exporting Alaskan oil to Israel.

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the planning commission and will continue to do so as long as his report is pending."

"The morality and character of each commissioner and the planning commission is as a whole beyond reproach," Lantz said. "As the chairman, I have no intention of allowing the commission to be further maligned by Mayor Carlson's report without the benefit of the commission's rebuttal, and am confident that after review, the matter can be satisfactorily resolved. It is my intent to prevent delays."

Lantz asks the commission to make the file open to the public once a decision is reached. He asks that if the APOC findings show no violations, the "case be closed."

City Clerk Kay Day to retire June1

City Clerk Kay Day, who has held that post since 1973, has announced that she will retire June 1.

City employees are eligible for retirement when they reach age 55.

"I have sincerely enjoyed these years of service in many ways," Day said. "I will look forward with sincere interest, as an observer in retirement, to the continuing progress of our city."

Day, a Fairbanksan for 29 years, started with the city in the Finance Department in 1964. In 1966 she moved to the clerk's office.

SUSITNA . . .

(Continued from page 1)

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That could mean by rough calculation, ". . . in the case of the Susitna project it is likely to double or triple the average cost of electricity to Chugach Electric Association customers over the entire period of 10 years or more before they begin to receive Susitna power."

The report says those costs would come down after the facility is on line because much of the capital cost would have already been paid, "but we believe that the public acceptability of such an arrangement is virtually nil."

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Fairbanks' Municipal Utilities System "is perhaps the most influenced by the boom-bust cycle of all Railbelt utilities." But the report adds that mid- to short-range power plans cannot be made on the basis of short bursts of activity.

Author of Susitna study ponders reply to critics

News-Miner Bureau

JUNEAU—Acres American Inc. and the Alaska Power Authority are considering replies to a report critical of the Acres study plan on the proposed Susitna hydroelectric project.

A draft copy of the report, prepared by the consulting firm of Arlon Tussing and Associates Inc., was given to legislators late last week.

Reps. Hugh Malone, D-Kenai, and Brian Rogers, D-Fairbanks, members of the House Power Alternatives Committee, hired the Tussing firm to review Acres' study plan.

Jim Landman, coordinator of the Acres Task One effort, said Monday that Acres' Anchorage office had just received a copy of the Tussing draft report that day.

Landman said copies would be circulated to main offices in Buffalo, N.Y., and Columbia, Md.

"I don't know that we will respond formally. I don't know whether the content of the report will change the direction of our study," Landman said.

"This is something we will have to discuss among ourselves and with the power authority," he added.

If Acres does respond, Landman said it probably would not be until later this week or early next week.

Eric Yould, executive director of the APA, was in Juneau Monday, and had not seen the Tussing report.

He said he knew the report was out, and added, "I had heard that the report was critical." Yould said he would read it and respond.

The Tussing review, prepared by Arlon Tussing, Lois Kramer and Barbara Morse, says Acres' study plan, released in February, needs substantial revision if it is to serve as the basis for an informed state decision on whether to go ahead with the Susitna project.

The report focuses on the need to strengthen the early studies in areas such as power alternatives, cost, risk, financing and consumer demand.

Three copies of the draft report, which is subject to revision, have been mailed to the Fairbanks Legislative Information Office, 101 College Road.

15 persons seeking seats on new Court of Appeals

ANCHORAGE (AP)—Five Superior Court Judges and the U.S. attorney for Alaska are among 15 persons who have applied for seats on the state's new three-member Intermediate Court of Appeals.

The court was established by the Legislature to relieve the workload on the Supreme Court. The new court will deal initially with criminal cases.

The Superior Court judges who submitted applications to the state Judicial Council before the filing deadline Monday were Thomas E. Schulz of Ketchikan, Roy Madsen of Kodiak, Warren W. Taylor of Fairbanks, and James K. Singleton and Ralph E. Moody of Anchorage.

U.S. Attorney Alexander O. Bryner, and the state's chief prosecutor, Daniel Hickey, also applied.

The other applicants included four assistant attorneys general and four lawyers in private practice.

The assistant attorneys general are Peter Michalski and Charles Merriner of Anchorage, Susan Burke of Juneau and Robert Coats of Fairbanks.

The four lawyers are Robert N. Opland, D. Ralph Stemp and A. Lee Peterson of Anchorage and Thomas F. Keever of Fairbanks.

The Judicial Council will screen the applicants and submit the names of two or more for each judgeship to the governor. The governor must appoint the judges from the among those nominations within 45 days of receiving them.

Low-interest loan program out of funds

ANCHORAGE (AP)—The Alaska Departmeht of Revenue says all $105 million committed to the state's emergency low-interest mortgage loan program has been allocated.

The program had been scheduled to last three months, but an agency spokesman said Monday that applications for the loans already exceed available funds.

(Related story on Page 7)

Dick Alexander, the state's mortgage investment officer, said financial institutions have been advised not to send any more applications to Juneau for processing.

He also said an estimated $10 million worth of applications already in Juneau will have to be rejected because of a

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Consultant urges state revamp oil leasing policy

JUNEAU (AP)—A consultant has told legislators that the state should eventually replace the oil industry's traditional role in exploration and development of petroleum resources by separating the process.

Dr. Michael Tanzer, whose New York firm evaluated various oil leasing methods, advances the idea in a report to Rep. Joe McKinnon, D-Anchorage, that was distributed to legislators this week.

McKinnon chairs the House Leasing Policy Committee, which last year studied what type of leasing method should be adopted for the Beaufort Sea oil and gas lease sale. The sale was in December, and despite hesitation by some administration officials, the net profits system was adopted.

Under that system, oil companies win leases based on the percentage of their production profits they offer to the state, instead of winning by the amount of cash they offer or how much oil they offer to share with the state.

Tanzer said the complicated monitoring and accounting setup the state needs with net profits leasing lays the groundwork for it to contract first for oil and gas exploration and then for production.

"It makes little sense to pay a high rate of profit to a company for its combined exploration and development effort, when the risky part of the investment is only a small part of the total," Tanzer said. "For example, in Prudhoe Bay, exploration amounted to only about $100 million, or about 3 per cent of the field development costs of over $3 billion."

Tanzer suggested the state should consider one of three ways to explore and develop petroleum resources:

• The state would award a contract to an oil field explorer based on the lowest bid on what the expected profit on the explorer's investment would be. The explorer could be paid out of future production revenues.

• A contract for exploration would be awarded based on the lowest expected share of future production by the explorer, in royalty or perhaps a share of net profits bid by the eventual developer.

• A contract for exploration would be awarded to the bidder asking the lowest share of cash bonus money, if the state decided to award bids for production on a cash bonus basis.

If no oil is found, the explorer would lose.

Tanzer reasons that the state probably would get higher offers for production if the bidders know the size of the oil deposits.

"With service contracts, the state has complete control of the pace and character of development of an oil field found," he said. "Thus, the state can choose among the various possible rates of production that which is best suited to its fiscal needs."

He added, "With service contracts, the state can directly determine what 'trade-offs' are to be made between economic and environmental considerations, rather than indirectly trying to force the companies to make environmentally sound decisions which may not be profitable to them."

Legislation aimed at "two-stage" leasing has been introduced since 1975, but has met stiff resistance from the oil industry.

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Power Boom Over

The Cheers Have Stopped for BPA

Few people know what it does, but the Bonneville Power Administration supplies a great deal of the Northwest's electricity — and determines what people pay for it.

This article concludes a series on the federal agency and its influential boss, Bonneville Power Administrator Sterling Munro.

By Joel Connelly

The Bonneville Power Administration was an agency with a populist mission when it was created by Congress in 1937.

Its task was to distribute — indeed, to find a market for — the abundant hydroelectric power from federal dams then being built on the Columbia River.

For many years, the BPA was part booster and part Santa Claus. It promoted dams and helped establish public utilities — doing battle with private power companies — and campaigned to bring the aluminum industry to the Northwest.

Nowadays, however, the cheering has stopped. Power is no longer abundant. Its price is soaring. And the BPA, as the key supply agency, is under fire.

"It has an impossible responsibility. The BPA is physically hooked up to everyone using power in the Northwest, which makes it politically responsible to everyone," said Jim Boldt, executive director of the Washington Public Utility Districts Association.

The old days of building dams and providing cheap power to eager consumers are over

Under federal law, some of the BPA's customers are entitled to get power before others — but everyone is hurting.

In 1973, the BPA cut off firm power supplies to private utilities such as Puget Power. The private utilities now get only surplus power, when it is available.

But Bonneville has also told public utilities — its preference customers — that the agency can no longer meet growth in their electrical demands after 1983.

The BPA has recently engaged in a year-long fight with WPPSS staff over how closely the federal agency could oversee construction of the nuclear plants.

A settlement was reached, but it left some bruises. WPPSS officials took "an extremely defensive, bomb shelter mentality" toward the negotiations, according to Munro.

There is no indication that closer supervision by the BPA can control WPPSS' soaring costs. A U.S. General Accounting Office report last September said that Bonneville was "not adequately prepared" to oversee nuclear construction.

"There has been a tremendous institutional friction between the BPA and WPPSS," said Seattle's Deputy Mayor Bob Royer, who oversees the city's participation in WPPSS.

The reason, according to Royer, is that WPPSS — which is building a total of five nuclear plants — once had ambitions to supplant the BPA as the Northwest's power marketing agency.

"It was like two big bureaucratic monsters confronting each other out in the field, with the earth shaking, to determine who would be master of the power lines," said Royer.

WPPSS is no longer so ambitious. Its nuclear program has nearly quadrupled in cost; the nuclear plants are running five to six years behind schedule; and the Supply System is the target of legislative probes.

Such battles demonstrate how agencies can develop minds and goals of their own. In the opinion of some critics, that has happened to the BPA.

"The BPA was set up to help the consumer, but when they speak of 'our customers,' they mean utilities," said Sierra Club Northwest representative Jim Blomquist. "From talking to them, you get the impression that the Bonneville Project Act was written for the aluminum companies."

The criticism is echoed by PUD spokesman Boldt. "A couple people who work for Bonneville have been very close to the aluminum producers and the private utility sector," he said.

It would appear to be an unfair charge, since the BPA has said it cannot supply power to aluminum plants in the future. But the agency has made some controversial moves to make sure aluminum producers keep getting power at present.

Last year, the BPA loaned 800 million kilowatts of power to aluminum plants — at a time when Oregon's Trojan Nuclear Plant was shut down, and BPA officials were warning of a serious electrical short-

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THE EXPRESS LANES of Interstate 5 through Seattle experienced a different kind of rush-hour traffic yesterday afternoon as more than 3,000 competitors

Citywide

By John O'Ryan

All they needed at Casey's during the basketball game yesterday was a couple of cheerleaders, and you'd have thought you were in the Coliseum.

Fans at the Olympic Hotel were seated at tables in a great oval around the life-size TV screen, their eyes riveted on the action, their hands gripping glasses and their ears deaf to cocktail waitresses.

Each Sonic basket was greeted with a rousing cheer that seemed to shake the house. If it was a spectacular basket, the patrons gave the team a standing ovation.

Things were the same all over Seattle during the final game of the Sonics-Bucks playoff series. People were glued to TV sets in taverns and lounges, street traffic was sparse, and transit patrons were waiting for buses with transistor radios to their ears.

Around the intersection of Third Avenue and Union Street, patrons of Denty's Tavern were watching TV, at The Turf they were listening to a radio, and at the RD Cafeteria the game blared from a radio set up in the kitchen by

their electrical demands after 1983.

The aluminum industry, which uses 25 percent of the BPA's power, has received the worst tidings. Bonneville has said it cannot renew the industry's long-term power contracts, which expire between 1984 and 1988.

The BPA is also raising its rates. It increased wholesale power charges an average 88 percent last December. Seattle City Light, which generates part of its own power, saw rates go up a whopping 112 percent.

The BPA plans four more rate increases during the next five years, which are expected to total an additional 45 percent over pre-December rates.

The rate increases which come out of the BPA's computers in Portland are felt in the electrical bills paid by every household in the Northwest.

The BPA's wholesale increase is expected to account for at least half of the 30 percent-plus rate boost that Seattle City Light customers will probably be paying this fall.

Recently, the Snohomish County Public Utility District — which gets all its power from the BPA — raised rates 39 percent for residential customers and 75 percent for business and industry.

The reason behind the BPA's steep rate increase is something known in utility jargon as "net billing." It translates into the high cost of nuclear power.

In 1971 and 1973, after authorization by Congress, the BPA agreed to purchase the full output of two nuclear plants and 70 percent of a third — regardless of what the electricity would eventually cost.

The estimated cost of those three nuclear plants has since zoomed from $1.55 billion to $7.8 billion. The trouble-plagued plants are being built at Hanford and Satsop by the Washington Public Power Supply System.

The BPA's Munro is understandably defensive about the nuclear deal. Congressional authorization for purchase of the nuclear plants' power was backed by Sen. Henry Jackson and was passed while Munro was Jackson's administrative assistant.

"The BPA purchased the capabilities of these nuclear plants because those plants were the least costly resources available to meet the region's increasing demand for power," Munro said in a recent

Seattle Post-Intelligencer

Vol. No. 117, No. 112.

Life/Styles Editors	628-8361
Classified Want Ads	622-FAST
(Outside Seattle	1-800-552-7232)
Carrier Delivery Service	628-8100
(Outside Seattle	1-800-552-0663)
National Advertising	682-8233
News Department	628-8350
Newspaper in Education	628-8150
Personnel Department	628-8076
Promotion Department	628-8085
Retail Advertising	628-8211
Sports Editors	628-8370
Sports Scores	628-8377
All Other Departments	628-8000

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were warning of a serious electrical shortage in the Northwest.

The BPA's power loans "show that Bonneville has been and still is an operating arm of private industry . . . The agency is simply not serving the public in the Northwest," charged Oregon's U.S. Rep. Jim Weaver, a frequent agency critic.

Earlier this month, the BPA restored a large chunk of its interruptible power supply to aluminum producers, even though a below-normal water year is forecast for the Northwest.

(About 25 percent of the industry's power supply is interruptible, meaning it can be cut off in low-water years when the Northwest is short of power.)

The strongest protests against the BPA have come from California, which gets about 7 percent of its power from the Northwest. But Californians stand last in line, and do not get power if this region's utilities or industries need it.

California doesn't like its last-in-line position. Its utilities must burn oil — at enormous cost, and contrary to national energy policy — when surplus supplies from the Northwest are cut off.

"They've been telling us energy is in short supply and then turning around and giving it to the aluminum industry," said Dan Richard, special adviser to the chairman of the California Energy Commission. In response, Munro points to the BPA's legal obligation to give preference to aluminum producers. "We're kind of fussy," he said. "We have to obey the law."

California has also been forced to pay much higher price increases than the BPA's customers in the Northwest. The BPA is charging Golden State customers as much as 500 percent more for power. California has appealed the new rates to the Federal Energy Regulatory Commission.

But anger to the south has not fazed Munro, who argues that the BPA exists first and foremost to serve the Northwest. "Regionalism has been a valid and important component in resource development," he said.

The BPA is not shrinking from criticism. In fact, the agency is promoting a vastly expanded role for itself in the Northwest's energy future.

The agency currently supplies about 50 percent of the Northwest's power, its prime customers being public utilities and aluminum plants.

But under regional power legislation — currently pending in Congress — that percentage would go up. The BPA would provide power to homes and farms served by private utilities. It would also underwrite construction of whatever additional nuclear and coal-fired power plants are needed in the Northwest.

The BPA has seemed to recognize that its actions — whatever they are — are bound to stir up controversy. The old days of building dams and providing cheap power to eager consumers are over.

In a recent talk, Munro commented: "Once people cheered when ground was broken for a new power plant of any kind — be it a hydro plant in the Northwest, an oil-fired plant in Manhattan, a coal-fired plant in Pittsburgh, a nuclear project on the outskirts of Chicago — whatever, and wherever. Today the common thread is conflict . . ."

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20 Pages

4/21

Susitna study said to need 'overhaul'

By SUSAN FISHER
News-Miner Bureau

JUNEAU—A special consultant's report says the Acres American Inc. study plan of Susitna hydropower needs a "major overhaul" if it is to be the base for deciding whether to go ahead with the project.

The draft report by Arlon Tussing and Associates Inc. was handed late last week to Reps. Hugh Malone, D-Kenai, and Brian Rogers, D-Fairbanks.

Malone and Rogers, members of the House Power Alternatives Study Committee, hired the Tussing firm to analyze Acres' study plan.

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(See SUSITNA, page 3)

SUSITNA . . .

(Continued from page 1)

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duplex. See story on Back Page.

See Back Page, PARKER

4/23/80

Consultant blasts Susitna hydro plan

By SARAH MOTT
Daily News correspondent

In the wake of severe criticism in a consultant's report to the legislature, major changes will be made in the proposed Susitna dam project, planners said Tuesday.

A report released Tuesday by Arlon R. Tussing and Associates blasted the current hydroelectric power plan as "consistently superficial," and requiring a "complete overhaul." Tussing made eight recommendations for additions to the study, additions which would cost an estimated $1 million.

Tussing said that with the "incomplete or defective information", planners will use, the findings will be "rubbish" and "no use whatsoever in making an informed decision on Susitna."

In reaction to the study and recent public meetings held throughout the railbelt area, the Alaska Power Authority will meet with the legislature later this week to request funds for the further studies. Robert Mohn of the authority estimated the request will be between $500,000 and Tussing's $1 million mark.

Mohn said Tussing "tends to use extreme language to get a point across," but he conceded many of the recommended changes in the proposed power project for Southcentral Alaska are good ones.

Tussing's review of the plan of study cited two broad-based inadequacies:

• A decision on the project's practicality would not be based on either economic or

See Back Page, SUSITNA

Susitna

Continued from page A-1

financial feasiblity, and,

• The substance and sequence of planning work implies that those involved have already decided the Susitna dam is the best energy alternative for the railbelt area.

Tussing contended the "gravest defect" demands an "overhaul of the organization and scheduling of the project as a whole."

His report charges that Acres International — the firm doing the planning — does not equally compare the costs and risks of Susitna and alternative energy sources. Costs and risks for alternative sources will be examined early in the planning, while similar studies for Susitna won't be done until much later.

Tussing's report also questions the reliability of power requirement forecasts, claiming the forecasts are based on uncertain assumptions.

Contrary to speculation by proponents and critics alike, Tussing concluded that cheap power sources do not by themselves attract industry.

Moreover, Tussing's report predicts the most likely scenario for the railbelt is a peak in activity and electricity demand in the late 1980s, which will then "fall sharply for at least several years." Those several years coincide with the end of the dam construction and the availability of all its power.

Tussing's report also says marketing and financing of the proposed project are not being adequately considered, particularly with the existence of a bad market for revenue bonds and without the the support of one of the proposed users of the electricity, Chugach Electric Association.

The Acres financing plan discusses generating "the necessary degree of infectious enthusiasm" rather than market strategy, leading Tussing to conclude "it is conceivable that the authors are not referring to selling electricity at all, but only to selling the project."

While Tussing's report notes that the plan of study does not explicitly presume the Susitna project is feasible, the substance of the work indicates a decision has already been made. Lack of funds, insufficient time and inadequate economic comparisons are cited as flaws in the alternative energy studies, which are scheduled to end in December.

The eight recommendations by Tussing include providing funds for alternative energy studies "as thorough and reliable as those for Susitna itself," and preliminary cost, risk and scheduling comparisons.

Mohn acknowledged Tussing makes a "good point" in condemning the alternative source studies and expects some major changes to take place in that area of the plan.